

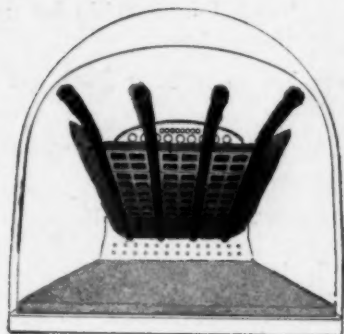
FEB 25 1924

Railway Age

FIRST HALF OF 1924—No. 8

NEW YORK—FEBRUARY 23, 1924—CHICAGO

SIXTY-NINTH YEAR



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*Price of coal at the mines	Proportion of fuel to Operating Expense
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1922\$3.02	192211.77

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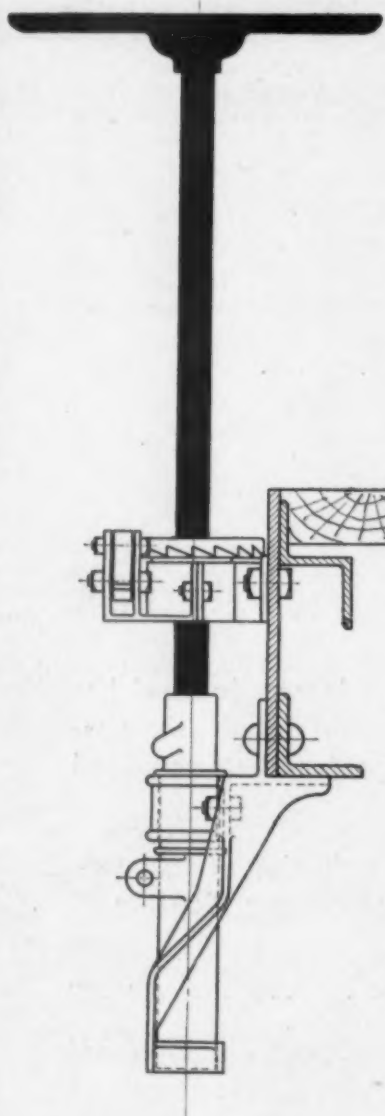


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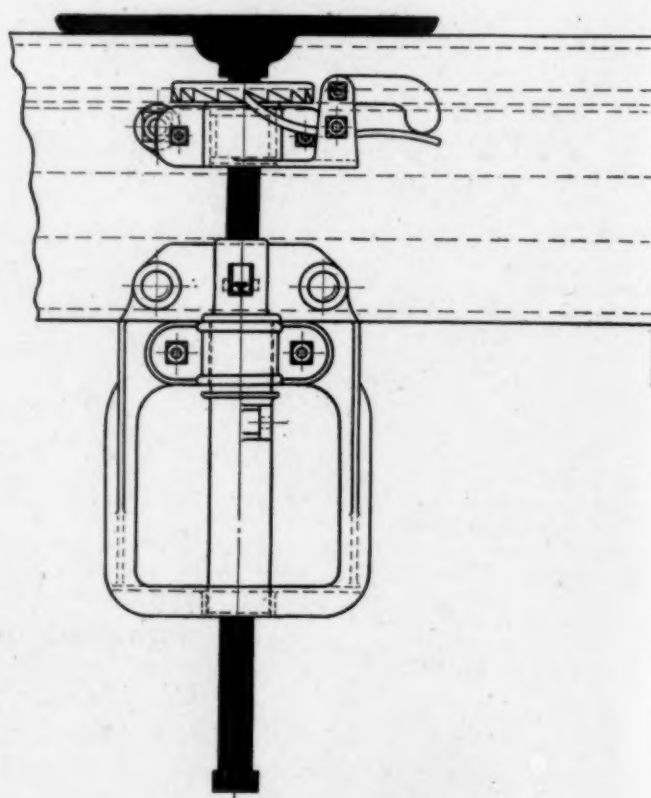
Brought back into normal operating position by simply raising up the wheel and shaft. The trigger automatically locks the shaft securely in place.

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EDITORIAL



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We Want Your Co-operation

MANY ARTICLES have been published in the *Railway Age* during the past few years on the necessity of building up the morale in railroad organizations and securing a larger degree of co-operation between the employees and the managements. Many concrete suggestions have been made looking toward this end. Much has been said as to the necessity for improved methods of administration of human relations on the railroads. The desirability of this is not questioned. It is quite generally admitted that it will be productive of concrete results in the form of more economical and efficient operation. The difficulty is just where to start this work and how to develop it on a sound, intelligent basis. This whole question has been receiving a large amount of careful thought and study and railroad executives have looked with much interest toward the best practices which have been developed in other industries. Important forward steps have been taken by a number of railroads during the past few years, some of them on a fairly large scale, and others of a more limited or highly specialized nature touching upon the fringes of the problem. Not a few railroad officers are asking this question: What are the fundamental elements involved and just what sort of a definite program can be evolved which will be reasonably sure of getting concrete results?

We want the best thought from our readers on the "Best Methods for Bringing About Co-operation Between Railways and Their Employees to Promote Efficiency." To this end we will give a first prize of \$100, and a second prize of \$75 for the two best papers received before April 15, 1924. The judges will be asked to base their decision on the practical value of the suggestions which are offered. Articles not awarded a prize, but which are accepted for publication, will be paid for according to our usual rates. Contributions should be addressed to the Editor of the *Railway Age*, 30 Church street, New York.

The position of enginehouse foreman at a busy terminal is exacting enough under the best conditions. There is a time

Lost Time in Enginehouses

limit on most of the locomotive conditioning operations and when the demand for motive power exceeds the supply, the foreman must continually rack his brain for some way of getting locomotives back into service more quickly and thus reduce their unproductive time. If the conditioning time at a terminal turning 48 locomotives in 24 hours can be reduced only 30 minutes, that will be the equivalent of placing one additional locomotive in service. Some of the things which delay terminal work and cause enginehouse foremen the most worry, as outlined in an article by E. Gelzer, mechan-

ical engineer of the Chicago Great Western, published in the February issue of the *Railway Mechanical Engineer* are, (1) Time lost by the mechanics in covering the circle; (a) to locate the engine; (b) to discover the defect; and (c) to get the necessary tools and material together to do the work required. (2) Time lost in reporting deficiencies, either in material, tools or reports. (3) Time lost owing to a lack of proper heating and ventilation and of facilities for handling material. (4) Time lost in handling reports—too much red tape, whereby the foreman is prevented from doing proper supervisory work. This pertains particularly to railroads having production systems. (5) Time lost due to inadequate tools for firing up and thawing out engines. Some, if not most of the above difficulties and hindrances to enginehouse work can be overcome at comparatively small expense. Check them up at your terminal.

Those who have followed the trend of locomotive development for a considerable number of years, and whose memories are good, will recall the interest which centered around the advent and later the somewhat extensive use of compound locomotives in this country.

Will Compound Locomotives Come Back?

The economies shown by repeated tests were such that the subject of debate shifted from whether compounding was advantageous to what system was the best one to adopt. Then came the superheater and it was shown conclusively that the use of moderately superheated steam so reduced the cylinder condensation losses that the fuel savings thereby obtained were practically the same as those secured by using saturated steam in compound cylinders. Compound locomotives never were popular with American railroad motive power officers, largely on account of the increased complications in the designs and heavy maintenance expenses. As the superheater offered equivalent savings with greater simplicity and reduced maintenance costs, it rapidly gained in favor and for a number of years practically no compound locomotives have been placed in service in this country with the exception of those of the Mallet type. No really serious attempt was made to combine the superheater with compound cylinders. Railroad men generally dropped the compound with a sigh of relief and converted such locomotives as they already had to simple, superheated locomotives as rapidly as possible. In Europe, however, where the price of fuel averages much higher than in this country and where the labor costs have, in the past, made maintenance expenditures of less importance than fuel costs, the compound locomotive was not discarded as in this country. Steam pressures were increased and superheated steam has been used in conjunction with compounding. In this connection, the results which were obtained last year on two of the leading French railroads where comparisons were made between modern superheated simple locomotives and compound locomotives with high pressure superheated steam are of interest; they will be found elsewhere in this issue. It might be added that these compound locomotives have shown records of as low as $13\frac{1}{2}$ lb. of steam per indicated horsepower per hour and have averaged as low as $14\frac{1}{2}$ lb. for

extended periods. They have, moreover, developed over 2,400 indicated horsepower, or at the rate of one horsepower for each 85 lb. of locomotive weight. It may be some time before conditions on American roads become such that the compound locomotive is again used extensively, but some engineers already are considering the matter and one locomotive designed to employ very high pressure superheated steam in compound cylinders is now under construction. The steam locomotive has not yet reached the limit of its development in America.

One western road is following a systematic program of relieving congestion by installing automatic signals on short

Where Signals Are Needed Now

stretches of single track between the ends of double track, on grades, approaching terminals, etc. In several cases second track had been considered years ago at these points but the growing traffic is still being handled by reason of the increased track capacity afforded by the signaling. In one case, an installation of 12 miles of single track automatic signals between a junction and the end of double track has eliminated the delays to following trains formerly made necessary by the rather long manual block of 11 miles. The idea that it is necessary to signal an entire division in order to secure the benefits of signaling is erroneous, for as a rule the track capacity of a division is limited by conditions at some point, such as a long grade or the approach to a terminal. Signals on these grades will permit the closer spacing of trains, while signaling to the first or second siding out of a terminal will allow freight trains to move on the closer time of passenger trains with safety. Considering the relatively small cost of signaling these short stretches, and its effect in increasing the track capacity of the entire division, it would seem that other roads might well consider signaling of this character.

As far as figures relating to railway activity are any index of general business conditions—and they have come to be

Heavy Equipment Orders

regarded as a good index—favorable aspects greatly predominate. The car loadings for the week ended February 2, totaling 929,936, broke all records for this time of year. There has been a marked reduction in the freight car surplus. For the period January 23 to 31, there was an average surplus of 169,036 which was a reduction of 76,138 as compared with the average for the period of January 15 to 22. It has been said that the present railway traffic is larger than could be justified by present rates of industrial production. The conclusion is that the present traffic volume represents distribution rather than the movement of raw or semi-finished materials. If this conclusion is correct, the presumption is that increased volume of traffic in the bulkier commodities will follow later. The situation offers much room for interesting surmise and valuable analysis and the railways must perforce be interested as much as anybody for they are the principal transportation agency. Of much interest in the situation is the present state of the railway equipment market. The railways continue to prepare themselves to meet a heavy burden of traffic which is of importance because it, with other factors, portends that 1924 business will be moved as efficiently as was that of 1923. Equipment orders are forthcoming in sufficient volume to promise continuing activity for that large portion of American industry represented

in the railway supply field. The Equipment and Supplies column in this week's *Railway Age* evidences more activity in the equipment market than for a period of several months. Orders are reported in sizeable quantity for the New York Central, which company has now placed contracts for locomotives, freight cars and passenger cars in large volume. A further order for hopper cars is reported for the Norfolk & Western. There is a large order for the Santa Fe. Inquiries are reported for freight cars for the Southern, for a large number of passenger cars for the Canadian National, etc. Buyers in the United States so far this year—including the reports up to the issue of February 16 but not including the totals for the present week—have placed orders for 9,065 freight cars, 89 passenger cars and 209 locomotives. Canadian roads have, in addition, placed orders for 15 locomotives and 36 passenger cars. The freight car orders are particularly heavy and for February bid fair to be the best for any month since March of last year. There is little room for pessimism in the railway supply field at this time.

The Enginemen's Strike in Great Britain

A READING of the terms under which the recent strike of enginemen in Great Britain was settled leaves no doubt as to who won the strike—the railway companies and the National Wages Board were completely victorious. The only important concession made to the strikers was the provision for gradual, rather than immediate, application of some of the changes in working conditions which afforded the excuse for the strike. The most important of these changes was the increase of the working day, when computed upon the mileage rather than the hourly basis, from 120 miles to 150 miles. Under the terms of the strike settlement 130 miles will constitute a day's work for the present—this to be increased to 140 miles in July and to 150 on the first of next year. Miles run in addition to the standard will be paid for on a basis of one hour for each 15 miles. These figures should be of interest to railway men on this continent, where 100 miles constitutes the standard day.

Some pertinent observations as to union characteristics and union tactics can be drawn from this strike. One of the most outstanding of these is that the old-line union organized on a craft basis is not necessarily more conservative or more fair-minded than the industrial union which includes all classes of employees in a given industry. The decision of the National Wages Board against which the members of the Amalgamated Society of Locomotive Engineers and Firemen struck was subscribed to by the National Union of Railwaymen, which covers the whole industry, and the enginemen—approximately one-third of the total—belonging to the N. U. R. did not strike. The leaders of the N. U. R. took a firm stand for the acceptance of all awards, favorable or unfavorable, made by the National Wages Board—which, incidentally, is constituted in much the same manner as the Railroad Labor Board in this country and, also like it, has only the force of public opinion to give weight to its decisions. The strike thus afforded the spectacle of an industrial union, a form usually supposed to be ultra-radical, taking a stand for legal and peaceful methods and the acceptance of decisions unfavorable to it, while a standard craft union repudiated peaceful and reasonable methods and resorted to a strike. Incidentally, less than 10 per cent of all enginemen in Great Britain work on a mileage basis anyway; the average wage reduction in such cases amounts to only about \$1.75 a week, leaving those

suffering the greatest reduction with a weekly wage of about \$32, which as wages go in Great Britain is very high. The estimated annual saving to the railways will be less than \$2,500,000. The enginemens' union, it seems, was willing to inflict a great injury on the railways and the public over a most paltry grievance.

Those who, with good reasons, regard with misgiving the advent of a Labor government in England can at least take some comfort in the fact that it is the railway union leaders who have taken a stand for arbitration and peaceful adjudication of disputes who stand high in the councils of the existing government and not those who rely wholly on the strike.

"Fair Return" and Return Actually Earned

THE STATISTICS of the Bureau of Railway Economics show that the net operating income earned by all the Class I roads in 1923 was 5.10 per cent upon their tentative valuation. This final outcome is disappointing because the return earned in the early part of the year was at a substantially higher rate. The principal reason why the return earned in the latter part of the year was relatively less than in the earlier part was that the total freight business was relatively smaller in the second half of the year. The return earned by the eastern lines (including those in the Pocomantas region) was 5.4 per cent, that of the southern roads 5.84 per cent and that of the western roads 4.57 per cent. The southern roads set a new record, being the first group of roads to earn more in any year since the Transportation Act was passed than the "fair return" specified by the Interstate Commerce Commission.

The war-time government guarantees to the railways were withdrawn on August 31, 1920. It was long claimed, and is still sometimes asserted, that they were given a permanent "guarantee" by the Transportation Act. Of course, however, they have not had any guarantee since August 31, 1920. The Interstate Commerce Commission held that they were entitled to a return of 6 per cent until March 1, 1922, and subsequently of $5\frac{3}{4}$ per cent. In the three years and four months beginning September 1, 1920, and ending December 31, 1923, the Class I railways failed by \$1,086,600,000 to earn the net return to which the Commission held them entitled. The total "fair return" to which they were held entitled, the total amount of net operating income they actually earned and the difference between the "fair return" and the net return actually earned are shown in Table I.

TABLE I

Class I Roads—"Fair Return" and Actual Net Return Earned

	Total "Fair Return" Sept. 1, 1920 to December 31, 1923	Net operating income actually earned	Difference between "Fair Return" and actual net return
Last 4 months 1920..	\$423,600,000	\$226,300,000	\$197,300,000
Year 1921	1,126,500,000	616,000,000	510,500,000
Year 1922	1,030,400,000	776,900,000	253,500,000
Year 1923	1,102,800,000	977,500,000	125,300,000
Totals	\$3,683,300,000	\$2,596,700,000	\$1,086,600,000

It will be noted that the return earned by the Class I roads as a whole during this entire period was only about 70 per cent of the amount to which the commission held them entitled, and which it has been repeatedly asserted they were "guaranteed." The financial outcome in 1923 was, of course, much better than in 1921 and 1922 but it fell far short of restoring the railways to the pre-war basis of net return.

There was no tentative valuation in 1916 and 1917, and, therefore, comparison with those years must be based upon the return earned on property investment. This in 1916 was 5.93 per cent and in 1917, 5.13 per cent, while in 1923 it was only 4.47 per cent.

The eastern roads in 1923 earned about \$31,000,000 less than the fair return fixed by the Commission, the western roads about \$97,000,000 less and the southern roads almost \$2,000,000 more. The "fair return" that the railways of the different groups were entitled under the rulings of the Commission to have earned from September 1, 1920, to December 31, 1923, the net operating income that they did earn and the deficiencies incurred are shown in Table II.

TABLE II

Class I Roads by Groups—"Fair Return" and Actual Net Return Earned, September 1, 1920, to December 31, 1923

	"Fair return"	Actual net return earned	Difference between "fair return" and net return earned
Eastern roads	\$1,689,200,000	\$1,182,000,000	\$507,200,000
Western roads	1,562,100,000	1,098,700,000	463,400,000
Southern roads	432,000,000	316,000,000	116,000,000
Totals	\$3,683,300,000	\$2,596,700,000	\$1,086,600,000

The figures show that the railways of all groups have failed by large amounts to earn the returns to which the Commission has held them entitled. There has not been relatively as much difference between the deficiencies incurred by the different groups of roads as probably is generally believed. In the entire period since the guarantees were withdrawn both the eastern and western groups have earned about 70 per cent and the southern group about 73 per cent of their "fair return." Probably it is generally believed that the western roads have done relatively much worse than the roads of the other groups, but the fact is that the western roads fared better in 1921, than those of either of the other groups and slightly better even in 1922 than the eastern roads. They fared much worse last year than the other roads because their earnings were affected much more by the relatively large reductions made in the rates on farm products and because their traffic did not increase as much in proportion as that of the eastern and southern roads.

The facts that have been presented raise the very important question of what policy the Interstate Commerce Commission is going to follow in future in regulating rates, and especially rates in western territory. Over three years have passed since the government guarantees were withdrawn and the Commission began holding specifically what return the railways are entitled to earn. These have included two years when business was poor and the railways could not reasonably have expected to have earned a "fair return." They have also included one year when a record-breaking freight business was handled and when the railways might reasonably have expected to earn more than a "fair return" to partly offset the deficiency incurred in the preceding two years. But even in this year of heavy business the railways as a whole did not earn a "fair return" and the western roads fell far short of earning what had been held would be "fair" for them.

Nevertheless, demands are being made both for advances in wages and reductions in rates. The railways are going ahead making large capital expenditures to enable them to handle the country's business, but the market for their securities continues to be so poor that they are financing these improvements almost entirely by increasing their indebtedness.

From the standpoint of the public welfare it is much more necessary that the net return being earned by the railways should be increased and stabilized than it is that any changes should be made in the wages being paid by them or that reductions in rates of any kind should be made.

How to Prevent a Labor Shortage Books and Special Articles of Interest to Railroads

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

AT THIS TIME last year the railways in common with other industries were facing an acute shortage of labor. All indications were that the year would be one of widespread industrial activity and that, as a result, the demand for labor would greatly exceed the supply, particularly in view of the fact that little relief could be expected from immigration. However, although the industrial activity reached a high level, as indicated by the record-breaking car loadings, the labor shortage failed to materialize to any serious degree other than in a few limited areas. The fact that this shortage did not develop was not an indication that the fears of the railroads were unfounded, but was rather a demonstration of the effectiveness of the methods which were adopted to meet the situation. This experience ought to afford a lesson which should not soon be forgotten.

Indications are that 1924 will equal last year in industrial activity. The automobile factories are preparing for an output greatly exceeding that of last year. The steel mills are working to capacity and the car loadings are exceeding those of the corresponding weeks of 1923. The railways themselves are planning large improvement programs, with liberal expenditures for maintenance. While there is now an ample supply of labor of a quality at least equal to that of recent years, the opening of construction work which is necessarily seasonal in character will exhaust this supply and it requires no stretch of the imagination to foresee an acute shortage unless the supply which is available is utilized efficiently. This is done most effectively by lengthening the working season as much as possible. It was in this respect that the roads secured the greatest results last year for as a whole they undertook their improvement work earlier and completed a larger portion of their maintenance work before the inroads of the harvest were evidenced than ever before. They also turned more largely to the use of labor saving equipment and this was no small factor in conserving labor.

The most effective way for the roads to protect themselves against a shortage of labor this year would be to resort again to the methods which turned out so satisfactorily last year. In addition to enabling them to complete a larger amount of work, these methods also contributed to the economy with which this work was conducted, an advantage in itself which should be sufficient to justify the laying of plans now to undertake all major work with the first approach of spring.

New Books

Atlas of Traffic Maps, by Charles E. Wymond. Published by La Salle Extension University, Chicago, 1924. Bound in cloth, 10 in. x 11¾ in. Price \$4.50.

This publication appears to be a book, of the size mentioned, and about one inch thick; but strictly speaking it is not a book; it is made up wholly of folded maps. For example, a map showing the Central Freight Association is on a sheet about 12 in. square; and a map showing the grouping of rates eastbound, over the Trunk Lines, covering the initial points from which rates are made, is about 18 in. square. Mr. Wymond is the official cartographer of the Central Freight Association and the La Salle Extension University in this publication makes his work available for all who desire information in that line.

There are 21 principal maps, showing, each by itself, all of the principal traffic association territories; for example, the Canadian Freight Association, the New England Freight Association, the Southeastern Freight Association, the Western Trunk Line Committee, the Associated Railways of Virginia and the Carolinas, etc.

Goats, by Frank W. Noxon. Two talks on railway equipment orders as affecting general business conditions, before Kiwanis and Rotary Clubs at Lima, Ohio. "Question Box" answering specific questions on railway policy, p. 18-32. 32 p. Published by Railway Business Association, Philadelphia, Penna.

A Manual for Mutual Benefit Associations. Research Report No. 66, of National Industrial Conference Board. The Philadelphia & Reading Relief Association is listed as typical organization on steam railroads, p. 48. 48 p. Published by National Industrial Conference Board, New York. 75 cents.

An Outline of the British Labor Movement, by Paul Blanshard. Labor party's program for nationalization of mines and railroads, reasons therefor, and proposed methods for accomplishment, p. 35-39. "Democratic machinery for control of industry," after nationalization, p. 36. 174 p. Published by Doran, New York. \$1.50.

Proceedings of the National Safety Council, 1923. Steam railroad section proceedings, p. 1023-1096. 1166 p. Published by National Safety Council, Chicago, Ill. \$3.00.

Solid Foundations for Better and Cheaper Transportation Service, by A. J. County. Address before American Institute of Electrical Engineers, Feb. 5, 1924. 14 p. Publisher not given, but probably obtainable from Pennsylvania Railroad Company, Philadelphia, Penna.

The World-Struggle for Oil. Translated from the French of Pierre l'Espagnol de la Tramerye, by C. Leonard Leese. Suggested for those interested in the effect of the introduction and increasing use of oil-burning locomotives on the production and price of petroleum (Chapter 3) and for those tired of mere fiction. 259 p. Published by Knopf, New York. \$2.75.

Periodical Articles

Can the Railways Meet the Next Peak? With Present Equipment They Cannot Handle Expected 1925 Traffic, by Alba B. Johnson. Barron's, February 18, 1924, p. 11.

Fiber Shipping Case Economics, by William A. Vollmer. Savings in freight costs by standardized packing and use of fiber cases, p. 188-192. Management and Administration, February, 1924, p. 187-193.

The Progressive Conference, by Arthur E. Holder. The "shortest political platform," begins with a plank for repeal of Transportation Act. Public Affairs, February, 1924, p. 6.

Recent Political Developments: Progress or Change? by Harry A. Garfield. Past accomplishments of industrial and international commissions in settling strikes and disagreements, and finding facts, and a plan for permanent commissions for the coal, railroad and other industries. American Political Science Review, February, 1924, p. 1-17.

What's Wrong with the Farmer? by Arthur Capper. Advocates reduction of freight rates and construction of St. Lawrence waterway. Public Affairs, February, 1924, p. 6.

When the Reds Get Down to Business, by Anna Louise Strong. Idiosyncracies of railroad and coal mine operation in Soviet Russia. Collier's, February 16, 1924, p. 10.

WASHINGTON STREET, SYRACUSE, through which the New York Central operates its trains, is a paradise of comfort, convenience and safety in comparison with the New England Main street through which trunk-route motor travel is constantly passing.—*Springfield Republican*.

Illinois Central Builds Large Yard at Chicago

Two Papers Describe the Layout and Outline the Advantages of the New Markham Yard

MARKHAM yard, which the Illinois Central is now building in the vicinity of Chicago will be, when completed, one of the largest classification yards in the United States. It will be used for the classification of practically all freight entering and leaving the Chicago terminals of this railroad, with the exception of certain time freight trains. It will also serve as a transfer point from steam to electrical operation, and vice versa, when the Illinois Central's project for electrification within the Chicago terminal area has been completed. Because of the importance of this project it was the subject of two papers presented before the Western Society of Engineers on Monday evening, February 18, which are presented in abstract below:

Design of Terminal Introduces Many Problems

By W. P. Cronican

Chief Draftsman, Illinois Central, Chicago

Markham Yard is located about twenty-one miles south of the Chicago river, between the towns of Harvey and Homewood, adjacent to the main line of the railroad. It is now about sixty per cent complete.

The yard has been built to meet the needs of the growing business of the Illinois Central in the Chicago terminal. During the month of March, 1918, the number of loaded cars arriving in Chicago from the south was 33,899, or an increase of 16,000 cars, or 90 per cent over the same month in 1913. Various plans for the expansion of the existing yards had been proposed, but after careful study it was found that this could not be done and a new terminal was determined on.

A Favorable Site Was Found

The site selected, comprising about 400 acres lying east of the right of way and extending for three miles between the city of Harvey and the village of Homewood, offered almost all of the desired features. This land was practically vacant, with few streets, and, with the exception of a few acres within the corporate limits of Harvey and Homewood, was purchased as acreage property. The tract was far enough south to offer a satisfactory terminal for the change from steam power operating from the south to proposed electric power operating into the city. The natural rise in the surface is about 50 ft. between the Harvey end on the north and the Homewood end on the south, thus making the grading requirements for the north-bound section of the yard much smaller than would otherwise be expected. Since most of the trains moving south from the yard have less tonnage than the entering north-bound trains, the gradients over the south-bound unit of the yard could be increased over those of the north-bound. Another good feature of the site selected is that it lies south of most of the important interchange points with other railroads entering Chicago. This makes it unnecessary to move cars intended for delivery to other railroads beyond the actual interchange points.

Heavy Grading Required

Nearly all of the grading for Markham yard, amounting to approximately 4,000,000 cu. yd. will be embankment. A light cut will be necessary in the south-bound section at the Homewood end. The fill at the north end of the yard is

increased by the grade separation at 159th street. The maximum height of fill is at the humps, a 27-ft. bank being required in the north-bound and a 30-ft. bank in the south-bound section.

Sand for embankments was first taken from property purchased for a borrow pit a mile east of the yard, but later was secured from the dunes near Miller, Ind. Considerable material for embankments has also been obtained in the form of industrial refuse collected at points in and around Chicago, which has been unloaded from cars by locomotive cranes.

The maximum gradient in the north-bound section, aside from the hump itself, is 0.35 per cent. This gradient is necessary on account of the elevated main tracks at Harvey. The maximum gradient in the south-bound section is 0.55 per cent, approaching the main tracks at Homewood. The hump gradients have been established after an exhaustive study of similar humps throughout the country and the operation of the Illinois Central's hump yard at Centralia, Ill.

Yard Provides Classification in Each Direction

Markham Yard consists of receiving, classifying and departing units for both north and south-bound movements. In addition, an l.c.l. transfer yard with five 700-ft. transfer platforms, a 1,000-car repair yard, complete modern icing facilities, and a 60-stall engine terminal will be constructed within the limits of the yard. The north-bound receiving unit consists of twenty 100-car tracks, divided into groups of 10 tracks spaced 13.5 ft. center to center, with a 19-ft. space between groups. Twelve of these tracks have been built. The remaining eight will be built as the necessity arises. In conjunction with the north-bound receiving yard five additional 50-car tracks have been provided for cars requiring reclassification.

The hump end of the north-bound receiving yard is arranged with two parallel ladder tracks leading directly to the hump. Movement to the secondary ladder track is accomplished by means of slip switches in the main ladder. In all cases the train being moved over the hump uses the secondary ladder, thus leaving the main ladder clear for the release of road engines after pulling their trains into the yard.

Design of the Humps

The hump in the north-bound unit is located just north of 171st street. It has been designed for the use of a mechanical hump at the apex and a 60-ft., 150-ton, automatic recording scale located beyond it. The distance from the center of the mechanical hump to the center of the scales is 101.5 ft., with 35 ft. of 3.25 per cent gradient between. This affords a maximum weighing speed of 7 miles per hour. It is approximately 3,000 ft. from the scales to the lower end of the classification yard and the gradients have been fixed to give a velocity of 11.7 miles per hour at the end. The scale is laid on a 1 per cent descending gradient, beyond this is a 3 per cent grade for 95 ft., next there is a 2 per cent grade for 158 ft., which connects with the 1 per cent grade through the yard.

The north-bound classification yard has 62 tracks, not including a grid of 13 tracks for commercial coal and the necessary tracks for light repair and bad order cars. The tracks vary from 20 to 60 cars in length, the short tracks being used for industrial classifications. The total capacity of this unit is 2,600 cars. Tracks are divided into groups of 10, with a ladder for each group at the hump end and a separate ladder for each 5 tracks at the lower end. Tracks are spaced

13.5 ft. center to center with 19 ft. between groups. Each two groups are separated by a space of 34 ft., giving three routes into the yard for the electric rider cars.

Since the matter of car riders is a large item in the expense of operating a hump, it is important that consideration be given to a method for the quick return of these riders to the hump. The car recommended for this purpose is one designed for standard gage track with a short wheel base to permit its operation on sharp curves, and a length of 20 ft., with a cab mounted at the front, well above the body of the car to permit an unobstructed view while operating forward or backward. A foot board should be provided for the riders with a grab iron at shoulder level on the sides and rear of the car.

The cars will operate from the hump through 14-ft. reinforced concrete tunnels at the throat of the yard, leading into the 34-ft. spaces mentioned before. The approaches to the tunnels will be on 6 per cent grades for approximately 400 ft., with 24-deg. curves at the portals. The cars will operate at a speed of 20 miles per hour, slowing down at the tunnels to insure safety. At this speed it will be possible for a car to run into the yard, pick up the riders and return in five minutes.

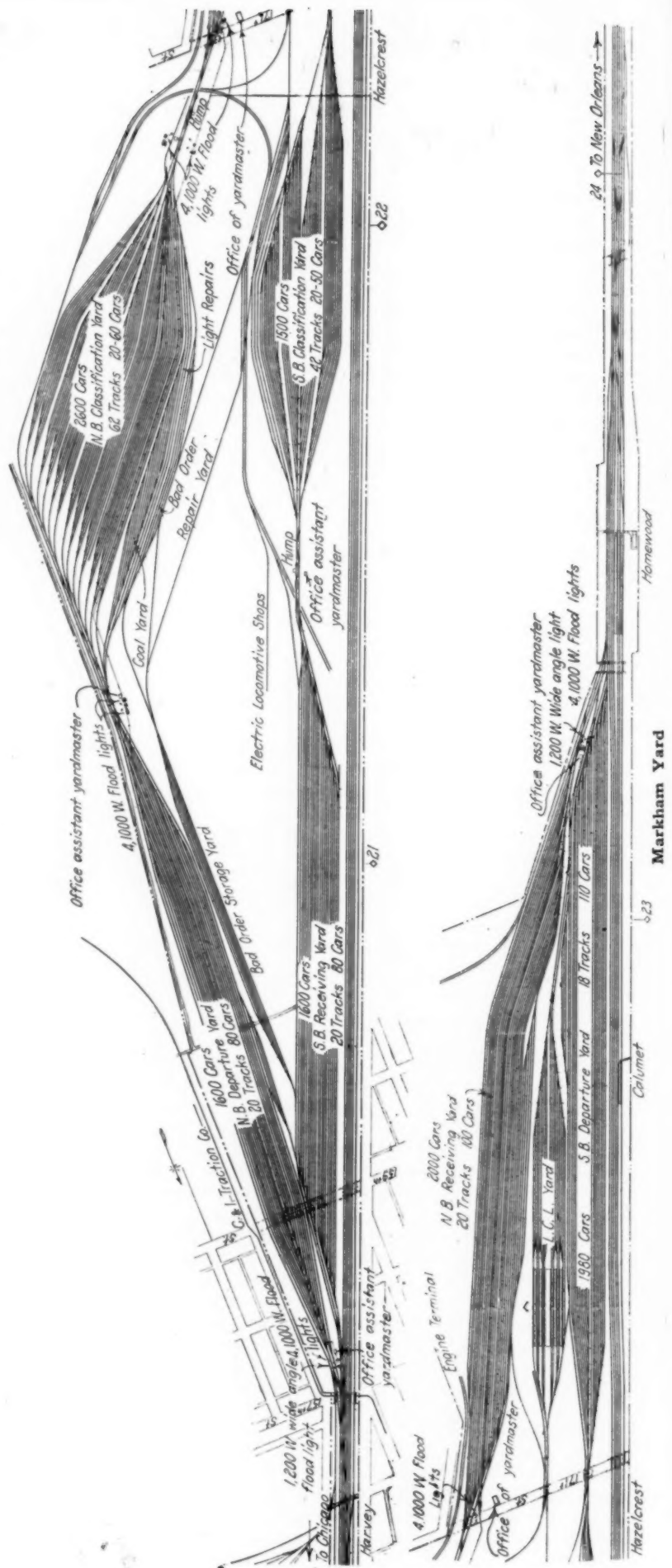
All switches at the hump end of the classification yard will be electrically operated from a tower located on the hump. The tower is so situated that the operator overlooks the entire yard. The control in the tower will be of the push-button type now in common use at yards throughout the country. In order to facilitate the electric control system and simplify operation at night, the ladder tracks have been built parallel to each other along the spaces left for the rider tracks. This method introduces extra curvature, but the additional resistance to the moving car due to this curvature has been taken care of in the grades. All switches are No. 8 and all curves are 10 deg.

At the outlet end of the classification yard it is necessary, because of property limitations, to provide a ladder for each five tracks and to connect each ladder with the departure yard leads with a 10-deg. curve. There is a slight disadvantage to this plan in the large number of switching leads, but this is more than compensated for in the increased length of tracks made possible by it.

The north-bound departure unit consists of twenty 80-car tracks, spaced 13.5 ft. center to center. A space of 17 ft. has been left between each five tracks to permit the erection of trolley poles at the time that the freight tracks are electrified into the city. Ten tracks are now laid; the other 10 will be built as the need arises.

At the north end of the departure yard a complete air testing plant will be installed to test and charge the trains before they are forwarded. A plant similar to this will be located at the south end of the south-bound departure yard.

The south-bound units are similar in arrangement to the north-bound. The grading for these units is about 75 per cent com-



plete at this time, but very little of the track work has been done. The south-bound receiving unit will consist of twenty 80-car tracks, 12 of which will be built at the present time. The classification unit will consist of 42 tracks with capacities ranging from 20 to 50 cars, and a total capacity of 1,500 cars. Two rider return tracks will be provided through the yard. The departure unit will consist of twenty 110-car tracks to accommodate trains of empty coal cars moving south to the mines. Ten of these tracks will be built at the present time.

L. C. L. Transfer

The less-than-car-load transfer yard will probably be located between the north-bound receiving unit and the south-bound departure unit, south of 171st street. The plans provide for placing 150 cars at the transfer platforms, and arrangements have been made for tracks leading directly from the classification yards into the l.c.l. yard. Switching of cars, when necessary, will be done in the l.c.l. yard, so no sorting will be necessary at the classification yards, other than the ordinary segregation of cars containing less than carload freight.

Plans for car repair facilities have not yet been approved, but it is probable that a bad order storage yard with a capacity of 1,000 cars will be located between the classification yards.

Bad order cars will be humped into grids located so that a quick transfer can be made into the storage yard. From here they will be moved as needed into the repair sheds located adjacent to and parallel with the north-bound departure yard. Light repairs to cars will be made on two tracks provided for this purpose along side the classification yards.

The Engine Terminal

The engine terminal will be located either adjacent to the north-bound receiving yard or between the north-bound departure yard and south-bound receiving yard. Objection to a more central location has been made because smoke drifting across the classification yards would tend to obscure the view of the towermen and riders, but the determining factor for the location of the mechanical facilities will probably be the length of the run for the road crews and engines after leaving the train.

A definite design for the engine terminal has not yet been approved but it has been estimated that the engine terminal will be required to handle from 150 to 200 engines per day during the busy seasons. The entire arrangement will be made as flexible as possible.

Grade Separation Required

Street subways are carried under the yard at two points in addition to undercrossings for the Dixie highway at Homewood, and for 157th street at Harvey. The subway for 159th street which passes under the south-bound receiving yard and the north-bound departure yard will be continuous for approximately 700 ft. with a width between faces of abutments of 70 ft. About 310 ft. of the subway, or enough to take care of the initial development of the yard, has been built. It is constructed of reinforced concrete with columns at each curb and at the center line of the street. The 171st street subway passes under three sections of the yard in addition to the main tracks.

It has also been necessary to provide a 32-ft. concrete box culvert for the Calumet Drainage canal which crosses the yard at 171st street, and double-track subways under both humps to accommodate engine running tracks.

Markham yard, when fully developed, will contain approximately 175 miles of track. It will have a standing capacity exceeding 12,000 cars and a working capacity of 6,000 cars per day.

New Yard Will Reduce Switching

By A. Bernard

Superintendent of Passenger Service, Illinois Central,
Chicago

The proposed method of operation of the new Markham yard is similar to that followed in other large yards of this kind. There are, however, some new features of the north-bound classification yard and its near neighbors, namely, the departure yard, the bad order car repair shed and yard, the bad order transfer yard and the l.c.l. merchandise transfer house on which it would be well to elaborate. There are 62 tracks in the classification yard and grid of 13 other tracks which are to be assigned as follows:

- 13 grid tracks for reclassifying commercial coal for local delivery.
- 20 tracks for cars for connecting lines to which deliveries are made at Chicago.
- 13 tracks for the various industrial districts located on the Illinois Central in the Chicago terminal district.
- 3 tracks for grain held for inspection and disposition.
- 6 tracks for coal and miscellaneous loading held for orders or disposition.
- 5 tracks for company coal and other company material, including heavy repair bad order cars.
- 1 track for bad order cars for the repair tracks.
- 1 track for bad order loads for transfer and adjustment.
- 1 track for merchandise for the transfer platform at Markham.
- 1 track for through cars west on the Illinois Central.

The remaining 11 tracks are to be used to classify cars, except commercial coal, for the "down-town" terminals. Through the use of these 11 tracks and the 13 grid tracks, it is anticipated that switching in the down-town section will be materially reduced.

After full trains are made up in the classification yard, they will be pulled into the departure yard by the trimmer engine where cabooses will be attached, air brakes will be tested, all necessary attention given the cars, and the train line charged so that when transfer locomotives, either steam or electric, are coupled on, the trains will be ready for immediate movement.

The cars on tracks assigned for grain, coal and other miscellaneous loading held for disposition or on account of embargoes, will be coupled up so that when disposition is given, and any of the cars in these tracks are ready for forwarding, the entire string may be pulled back by the hump engine and rehandled over the hump for classification.

It is the plan to place bad-order loads for repairs, by the trimmer engine shoving the cars from the bad-order classification track through and directly onto the repair tracks, thus eliminating the undesirable feature of chaining up cars without draw bars, and the other usual difficulties encountered when they have to be pulled from the classification tracks to be spotted on repair tracks. The one shove movement under this proposed plan will serve the purpose, as the repair tracks are to be so located at the classification yard as to permit this.

The handling and placing of bad-order loads for transfer and adjustment will be carried on in the same manner as the bad-order loads for repairs. Miscellaneous bad-order empty cars will be shoved from the classification tracks to the storage yard, whence they can be set for repairs as needed.

The l.c.l. merchandise for the transfer platforms at Markham yard will be handled in about the same manner as the bad-order cars, the only difference being that the opposite ends of the transfer platform tracks will be connected up with other tracks in the yard so that the cars made empty will be shoved away from the platform and into the yard with the same movement that spots the loads, and any other switching that may be necessary will be done in the l.c.l. merchandise yard.

It is expected that the 13 grid tracks and the 11 other tracks which are to be used for classifying commercial coal, will prove even more advantageous to operation. It is the

plan to classify cars on these tracks in such a manner that the cars upon arrival in the transfer trains at the Chicago yards, will be lined up in station or spot order, and it will be necessary only to place an engine behind the train and set the cars in their proper locations, without the necessity of making a single switch.

Under this plan it is the hope and expectation that freight switching operation north of Roosevelt road will be confined to set-backs, that is, switching out cars the loading or unloading of which has not been completed when the various tracks are pulled; also to the switching of such trains from the line as are handled directly to the freight yard at Chicago with road power on account of the nature of the loading, such as merchandise and perishable freight. Another important advantage in this plan of classifying is the greater degree of promptness and regularity with which the business will move and which will result in better service to the patrons.

Forecasting Traffic Volume*

By R. H. Aishton

President, American Railway Association

WITH YOUR 85 YEARS' EXPERIENCE in statistical matters behind you it would be presumptuous for me to emphasize before this body of expert statisticians the difficulties underlying any attempt to forecast the future in the field of business activity and the particular obstacles in the way of an accurate forecast when applied to traffic volume.

In the first place, railway freight traffic is a composite of the business activities of all other industries. To arrive at a forecast of freight traffic one must survey the whole business field. Forecasting by any other industry depends only on the factors that have a bearing on the particular industry involved, whereas the railways must take into account all the problems that are faced by all the industries that utilize their facilities, which means all the industries of the nation. That is the hard part of it.

The other side of the question is that the problem is simplified by the very fact that railway freight traffic is a composite—a cross section, if you please—of all industrial activities. A single industry, in forecasting the future, may easily go wrong, by placing its estimate too high or too low. When a large number of industries are combined, however, the law of averages will overcome in some degree the over- or under-estimating of individual industries. That is one factor that has to be taken into consideration.

Another one is that forecasts as to the future must rest in some measure on the records of the past. The only way in which estimates of future development can be made is by comparing the progress over long or short periods in the past and applying the knowledge so gained to the future. In addition to these, there are three other factors that have weight.

The first factor is the growth of population. Every decennial census taken in this country has disclosed a healthy increase in the population of the United States. The increase between 1910 and 1920, the latest decennial period, was about 14 per cent. During the first 20 years of the present century, or from 1900 to 1920, the increase was nearly 40 per cent.

The second factor is increased use of railway facilities per capita; that is, the increase in number of ton-miles per inhabitant per year, and of passenger-miles per inhabitant per year. It is difficult to appreciate, unless one looks into the matter in detail, how rapidly the per capita utilization of our railway facilities has increased during recent years. For

example, between 1900 and 1920 the number of ton-miles per capita increased more than 110 per cent. As there was an increase of 40 per cent in population during the same period, the cumulative result of an increase of 40 per cent in number of persons and an increase of 110 per cent in the use of the railways by each person, was an increase of 200 per cent in the total demand for transportation. The larger part of this 200 per cent increase was due to increased per capita use of railway transportation, both passenger and freight, while a smaller part was due to the increase in population.

The third factor is the continual change in character and composition of railway freight traffic. The average distance a ton of freight is hauled has been gradually increasing during the past 30 years and is now higher than ever before. The several commodities, and groups of commodities, making up the aggregate of railway freight, have also shown marked changes in recent years. It is clear that both factors play a considerable part in volume of freight traffic and in number of tons carried one mile. The volume is affected by the shift from heavy low grade commodities to light high grade commodities, or vice versa. The number of ton-miles is similarly affected, not only by the volume of freight but also by the average distance it is hauled.

The largest number of freight cars loaded in any week prior to 1923 had been 1,018,000, which occurred in the month of October, 1920. Only six times prior to 1923 had the railways loaded more than 1,000,000 cars in any week. One of our problems was to estimate what the peak loading of 1923 would be. Using the basis of computation outlined above, it developed that the peak week this year would be well in excess of 1,100,000 cars. This prospect was so greatly in excess of past experience that we reduced it to 1,080,000 in order to be safe.

That our estimate was conservative is indicated by the fact that our peak loading this year was slightly in excess of 1,097,000 cars, or within less than 3,000 cars of our original estimate of 1,100,000, or within three-tenths of one per cent. In addition, beginning with the first of June and continuing down to the second week of November, the railways loaded more than a million cars each successive week, with only three exceptions, those exceptions being the two holiday weeks in July and September, and the week in August during which occurred the funeral of President Harding. In all, there have been 21 weeks in 1923 in which more than a million cars have been loaded.

We now have the actual performance of the railroads for 1923 and I think you will agree with me that, in spite of the long forecast ahead and the difficulties in securing any accurate data, it is indeed remarkable that the total actual loading for the year is less than $2\frac{1}{2}$ per cent above the estimated figure of more than 48,000,000 car loads, and it is further gratifying that in place of being under the estimate the railroads have really performed a larger job than they planned for by that amount.

As to the future, I was supposed to have a subject assigned, "The Statistical Basis for a Forecast of Railway Traffic with Particular Reference to 1924." I will say to you very frankly that the problem today is a very different one from what it was last year. In 1923 the country was free from labor disturbances, either railroad or industrial. Business and agriculture, free from disturbing influences, had struck their stride.

In looking into 1924 we find ourselves without the same basis for a forecast as in 1923, not only in the respects mentioned, but also in the absence of any actual record of movement for the first two or three months in the year, which has a very large bearing in determining what the course of business will be during the succeeding months. As to what the volume of business will be during the year 1924 I am unable to say, but would be glad to have such expression of opinion as you statistical experts may care to offer.

*Abstract of a paper read to the American Statistical Association, Eighty-fifth Annual Meeting, at Washington, D. C., on December 29, 1923.

After some study of the problem, I am inclined to think that the first three months of the year furnish a fairly good measure of what the traffic of the year as a whole is likely to be. Taking the carloadings of the five years 1918 to 1922, I find that the average ratio of the loadings of the first three months to the total annual loadings was 22.66 per cent. That is, the railways in those five years handled between 22 and 23 per cent of their total freight business during the first quarter. Variations from this percentage in the several years are remarkably small, when we consider that the year 1918 was a war year, the year 1919 was a period of recession in business, the year 1920 was marked by feverish business activity and inflation, the year 1921 was one of deep depression, and that the year 1922 showed only partial recovery. In other words, none of these five years can be regarded as a normal business year, yet the highest percentage shown by the first quarter of any of them was 23.55 per cent, and the

lowest 21.84 per cent, compared with the five-year average of 22.66 per cent. The range from low to high was less than two per cent, and the maximum variation from the average was less than one per cent.

If this experience over the period of five years for which weekly carloading statistics are available supplies any basis for a method of forecasting for the future, it will be possible in any year, about the first of April, to estimate the probable traffic for the remainder of the year.

Such a forecast must always be made with the fact borne in mind that unforeseen occurrences such as prolonged industrial strikes, coal strikes, railway strikes, or foreign disturbances, may occur at any time to upset the estimate. Our presidential election every fourth year is also a disturbing element. Crop possibilities can never be accurately forecast. Seasonal variations in traffic cannot be accurately measured beforehand.

The Transportation Outlook for 1924*

Legislative Moratorium of Two to Four Years Needed To Assure Railroad Prosperity

By James C. Davis
Director General of Railroads

EFFICIENT TRANSPORTATION is absolutely essential to any sort of national prosperity and progress, and is the all-important element in the successful conduct of the three great industries which furnish and produce the bulk of the freight tonnage hauled by the railroads—mining, manufacturing and agriculture. This adequate service in transportation, so absolutely requisite to continued progress and prosperity, can only be obtained when the carriers are permitted to receive compensation based on a schedule of rates that will justify a high standard of maintenance, dependable service, and a reasonable return to the investor in railroad enterprises.

I believe that today and now the railroads of the United States are facing the most crucial situation since the government assumed the right and authority of control. They are at the parting of the ways. One road, the straight and narrow path, by strengthening and supporting private ownership, leads to a privately owned and operated system of transportation, which, if given reasonably remunerative rates, will furnish to the people of this country what they need and are entitled to—the cheapest and most effective transportation in the world. The other, the broad road, leads perhaps to destruction, or at least to government ownership, which I believe would be not only the greatest mistake in judgment but the most expensive experiment ever undertaken by this government, and eventually would result in an inefficient and unsatisfactory service, at a greatly increased cost.

With the hectic experience of the last three years, and what may be described as the creditable performance for 1923, what of the future for this vital and important interest?

At the end of federal control, Congress enacted a very elaborate bill designated as the Transportation Act. Perhaps no single piece of legislation has ever been more misrepresented and unjustly criticized than this instrument. It was the intelligent work of the best minds in Congress, after some years of investigation and study of the subject. After more than 30 years of desultory and haphazard regulation,

it was an attempt, in the light of experience, to codify the national laws on railroad regulation, and for the first time, in any of the state and national legislation that preceded it, there are enacted some reasonable provisions to protect the owners of the property.

As might be expected in a progressive act of this character, differences have arisen as to its proper construction, and in some particulars as to its constitutionality. Happily, these differences at this time have all been concluded. The Supreme Court, in what is known as the Wisconsin case, has sustained the power of the commission over intrastate rates, where such rates interfere with or become a burden on interstate commerce. In the New England case the authority of the commission to insist upon a proper division of joint rates was sustained. The jurisdiction and power of the Labor Board has been defined, and now in the last case, decided as late as January 7, 1924, the recapture of excess earnings, necessary to make an equitable disposition of the carriers' returns, has been fully endorsed and confirmed by the highest court in the land, so the carriers start the year 1924 with to some extent a rehabilitated credit, operating under constructive legislation that has for the first time received judicial interpretation and approval.

Does it not appeal to all conservative people that it is the course of wisdom to give this new law a fair trial? Undoubtedly it is not perfect, no human legislation is or can be, but, prior to indiscriminate amendment or repeal, does not the voice of reasonable prudence plead for the value of a few years' experience?

The only serious complaint against the carriers during 1923 is involved in the question of rates. The insistence of this complaint is largely from the agricultural interests of the great Middle West. Of course, everybody would like to see rates reduced, but reasonable and impartial men recognize that this reduction should not be made at the expense of efficient service.

No one minimizes the importance of a prosperous condition in agriculture. After products of mines and the products of manufacture, it is the greatest tonnage producing industry for the railroads in the land. In the agricul-

*From an address before the Traffic and Transportation Association, of Pittsburgh, on January 24, 1924.

tural districts of the Middle West, the success or failure of many of the largest railroad systems in the country depends absolutely upon the prosperity of the farmer. Singularly enough, the troubles of the farmer and the railroads are identical. The present complaint of the farmer is that the price of what he produces and sells is too low, while the price of what he buys is too high. The railroads have the same trouble. The price of what they sell, transportation, is not fixed by themselves but by the government. The price of what they buy, and the big item is labor and the products of labor, is fixed by some one over whom they have no control.

The transportation charge of the railroads is exactly the same whether hogs are selling at \$7.50 or \$15.00 per hundred, and whether wheat sells at 75 cents or \$1.50 a bushel. During the years of the war, when agricultural prices were at the peak, railroad rates remained stationary.

The truth of it is, railroad rates are not the cause of the agricultural depression, and a reduction of these rates is not its cure. It is the old case of over-production. During the war, foreign nations and our own government paid any price asked for the products of the farm. When the war ended, production at a high rate continued, but there were no customers for the product.

Again, the reduction in freight rates on wheat and corn, when applied to the individual farmer, represents from a fraction of a cent to two or three cents per bushel, no more than the usual fluctuations of the market during an ordinary month's time. This reduction would not cure the present agricultural depression, caused by over-production, and in many cases speculation in the increased value of land during the war period, but such a reduction, in the aggregate, spells ruin to the carriers, whose tonnage depends largely on the products of agriculture. The dividends declared by Class 1 railroads in 1922, as obtained from the Interstate Commerce Commission, aggregated some \$272,000,000. If these dividends were wiped out and applied to a general reduction in freight rates, it would only mean a reduction of about 6.8 per cent. A 6.8 per cent reduction on a freight rate of 12 cents or 15 cents a bushel is so small you can hardly estimate it.

The effect of freight rates on a given industry is greatly exaggerated, and advantage is often unfairly taken unconscionably to raise the price to the ultimate consumer.

The ability to pay modest dividends, with even the prosperous roads, rests on a very narrow margin. The Pennsylvania System, in the distribution of a dollar of gross earnings, has but 5.56 cents applicable to the payment of dividends and sustaining the credit of the corporation. A very slight reduction in income must result in deferred maintenance, reducing the standard of service, or wiping out dividends, which destroys credit.

There is another and more serious question in this attack upon the Transportation Act. It is an assault upon the provisions of our Constitution, seeking to destroy a principle which is the basis of all English speaking governments. Seven hundred years ago the barons of England wrested from an arbitrary king the declaration that the liberty of a citizen or his private property could not be taken from him "unless by the lawful judgment of his peers, and the law of the land." This principle has been perpetuated as the most priceless attribute of modern government.

Under our constitution, and the law as construed by the Supreme Court, railroads and public utilities are entitled to "a fair return upon the reasonable value of the property at the time it is being used by the public." A public tribunal, competent, fair and impartial, in the case of the carriers, acting under the provisions of law, has fixed that value, and so long as we have a constitution and courts, and are a people of law and order, this right of private property must and will be protected.

The credit of the railroads must be sustained if private ownership is to continue. Healthy finance in a corporate life means that the sale of capital stock instead of bonds should furnish new money. In the last 4½ years, 98.25 per cent of new capital invested in railroads has been raised by the sale of bonds, and only 1.75 per cent by the sale of stock. If this ratio continues, the ability of the carriers to raise new money is short lived.

May I paraphrase an expression borrowed from the Secretary of the Treasury, and apply it to the transportation question? What is needed is a diagnosis and a cure rather than an autopsy and a funeral.

It seems too bad that the opponents of fair treatment for the railroads cannot appraise the true situation. The railroads, as a matter of fact, are the slaves rather than the servants of the government. They are bound hand and foot to the wheel of the chariot of the Interstate Commerce Commission. The commission fixes rates, provides rules for service, approves stock and bond issues, controls new construction and abandonment, distributes equipment, fixes the price for using joint terminals, makes divisions for joint service, and recaptures all excess profits.

In the old days, if a man wanted good service from his slave, he at least gave him a reasonable shelter, proper clothes and food, and some recreation. He did this, if not from humanitarian reasons, as an investment to obtain the return of good service.

Should not the government and the people of this country, for the same reason, accord this treatment to the carriers. As I have often said, and now repeat, the railroads are the dray horse of the nation, and you cannot beat and starve your horse and have him carry the load.

The remedy for the present depression in agriculture does not lie in reducing transportation rates below the price at which the carriers can sustain themselves, but rather in those more direct and permanent methods of relief which go to the root of the trouble, and can be accomplished without the destruction of the transportation system, such remedies being largely found in diversified production, organized and orderly disposition, in a seasonable way, of crops, and more reasonable relations between the price of what agriculture produces and what it must purchase.

Every intelligent conservative is a true progressive, but real progress means scaling the heights, and the observation of natural laws. The road is hard, the progress is slow, and to obtain the correct results requires some courage, industry and patience.

No legerdemain of statutory law, no miracle in the way of joint resolutions, can overcome irrevocable and natural laws. The aftermath of a great war, with its endless train of disorganization, extravagance, and the destruction of private and public morale, cannot be cured over night. The recovery rests in courage, industry, and decent economy. Surely, we are a great enough people to exhibit all of these qualifications.

A legislative moratorium of two or four years would effect a cure. If not interfered with by adverse legislation, the three controlling parties in interest, the shipping public, the carriers, and the Interstate Commerce Commission, if given reasonable time, could bring about satisfactory results.

The controlling influence of transportation on individual and national prosperity justifies an active interest in this subject. If private ownership and operation of railroads is to continue, and an efficient and reliable service is to be maintained, the general public must make a study of this subject, to the end that legislative action will be constructive and not disorganizing; consistent with public interest and an enlightened public policy, and upon lines that will continue to give this nation what it now has and is always entitled to—the best and most efficient transportation system in the world.

Some Consolidation Considerations*

No General Presumption in Favored Consolidation— Which Are the Weak Roads?

By Lewis H. Haney

Professor of Railway Transportation, New York University

WE ARE IN SERIOUS danger of generalizing too hastily in discussing this subject. The trouble is that it is impossible to discuss railway consolidation as a homogeneous or uniform thing. There are many kinds of consolidation, and what is advantageous and what not, depends upon circumstances. There are no general advantages, or disadvantages of railway consolidation.

Thus there are consolidations of parallel lines and end to end consolidations; there are consolidations which overlap two or more rate territories while others lie entirely within a single territory; some give access to new sources of traffic, others do not. Some consolidations result in operating units so large as to make it doubtful if management can be efficient, while others are clearly more workable. Consolidations also differ in the degree to which they affect competition or disturb existing corporate relationships.

A moment's thought, furthermore, shows that the advantages or disadvantages claimed for consolidation in general are mostly hypothetical and intangible. After considerable study, I fail to find a single clear advantage of a general scheme for consolidating all the railways of the country into any such limited number as 19 or 20 great systems. The prevailing idea seems to be that reducing the number of systems would in some way, not specified, simplify railway regulation. Undoubtedly, it would reduce the number of accounting units and decrease the number of tariffs issued. It would possibly reduce somewhat the number of general officers, etc. The advantages of such simplicity, however, are probably more than counterbalanced by the difficulty of diffusing the administration and supervision of the railways' general officers over larger areas; and government regulation would in some respects be made more difficult by being forced to deal with varying local traffic and operating problems, through the medium of single, large, systems. Spreading a large blanket over a diverse area does not remove the diversity; it merely covers it up.

It is worth while reminding ourselves, too, that after all there are at present only about 89 operating systems of railway in the United States. The British railways are divided into 4 systems, but the United States is over 33 times as large as England and Scotland, and our mileage of railways is about 13 times as great.

Because one can not generalize about the advantages of consolidation and because the alleged advantages are so largely hypothetical the logical thing to do is to consider the particular purposes for the problem now before us and to inquire if the schemes of consolidation which have been proposed are calculated to attain those purposes. In other words, let us consider advantages and disadvantages with reference to the so-called "plan" of consolidation.

Weak Roads

As nearly as I can gather the fundamental purpose of the so-called "plan" of consolidation is to facilitate rate regulation, and that by the means of eliminating the so-called weak roads. Thus the elimination of the weak roads becomes the immediate purpose.

If this is a true statement of the purpose, it seems to me that we have not gone about attaining our object in a logical way. Indeed, I am of the opinion that we have taken the injunction of the act to "go to" and make a "plan" for a limited number of systems without due regard to the purpose. We have assumed too readily that we know what is meant by limited number of systems, and that by sitting down with a map and putting railways together in more or less symmetrical groups we are doing something which has virtue in itself. Proceeding on the basis of an analysis of the purpose, and accepting for the moment the assumption that the elimination of weak lines by consolidation with strong ones is fundamental, the following would seem to be the logical procedure:

(1) Determine exactly what roads are weak.

I find a strange lack of evidence on this point. It seems that it would be helpful as a first step to have a generally recognized list of weak lines. This would not be so easy as might appear. Just now some of the strong ones are showing weakness, while the weak are gaining. We may well remember that the New Haven was once a symbol of strength. Is the Chicago & North Western now weak?

(2) Determine exactly why each one of the weak roads is weak.

The causes of alleged weakness are numerous. In not a few cases, the so-called weakness is entirely a matter of capitalization. In other cases the weakness is undoubtedly due to the management. In others the trouble lies in the location of the road, as this affects its operating expenses or its traffic. In still others, the weakness may be found to lie, not in finance or management or location, but in the level of rates itself—nothing would entirely relieve the situation but the raising of rates.

(3) Having analyzed the grounds of weakness in each case, the next logical step would be to inquire if any consolidation would remove the weakness.

It is fairly obvious that while in some cases weak roads might be made stronger by certain consolidations, in other cases no feasible consolidations would remedy the situation. Certainly, mere size has no bearing on the question. Some large roads are weak and some small ones are strong. If the weakness of a road is due to its steep grades or circuitous route it is difficult to see how mere consolidation would help. If two roads are both weak because of the sparseness of the traffic supplied by the section in which they both operate, how can putting them together make them stronger? Both in the northwest and in the southwest there is a pretty general weakness. The Chicago & North Western and the Chicago, Milwaukee & St. Paul show operating and traffic results very similar to the Katy and the Missouri Pacific. These results are due to overbuilding and to low rates. There are only two alternatives; either to abandon a line or two or to raise rates. Putting the weak sisters together will do no good. If the people of those sections want railway service, can anyone tell me why they should not pay for it? And if they can't afford to pay, how are their weak roads to be made strong?

I would particularly emphasize two points in this connection. First, weakness which is due to bad management does not require consolidation as a remedy. Consolidation

*Address before the American Economic Association at Washington, D. C., on December 28, 1923.

might or might not improve the management, but the fact remains that what is needed is only an improved management, which might be gained by reorganization without consolidation. (Mr. Ford's Detroit, Toledo & Ironton apparently did not require consolidation in order to remove it from the ranks of the weak.) Second, weakness in financial structure does not prove the case for consolidation. Consolidation would not require a reorganization, and that reorganization might better be compelled without consolidation.

All the way through, we are in danger of assuming that steps which might be compelled in connection with a scheme of consolidation are necessarily a part of consolidation itself. I wonder if we are clinging to consolidation merely as a sort of solvent which will throw the whole corporate and financial structure of our railways into a state of flux and thus be the occasion for requiring a general reorganization of weak lines.

Remedies for Weakness

(4) Since we find cases in which consolidation could not help, the next step after determining what cases consolidation would remedy would be to *determine the requirements for eliminating weakness in cases which consolidation would not remedy*. Such a determination further emphasizes the futility of consolidation as a complete remedy.

Sometimes the only remedy for weakness is death. Even among railways, true mercy may sometimes lie in putting the sufferers out of their agony. One of our most prominent railway executives has estimated that as much as 30,000 miles of railway are uneconomic, and should be abandoned. While I am not prepared to argue that the case is as bad as that, I am sure that an appreciable increase in strength could be gained by pruning the railway net at points. (You might start by comparing the courses of the Soo Line and Great Northern in North Dakota.)

In some cases what the railways need is not consolidation but breaking up. In not a few instances, privately arranged consolidations have, in the past, proved ill-advised, and upon dismemberment the parts of the consolidation have shown greater prosperity. This appears to have been true with the Chicago & Eastern Illinois, which was benefited by the breaking up of its affiliation with the Frisco. Probably what the Erie needs first is breaking up—into a perfectly good coal road in the East and an extra track for the Pennsylvania in the West.

One source of weakness is found in the situation in which two competing carriers are placed on unequal terms because one of them is part of a connecting system. Two roads east of Buffalo may be competing for traffic between that city and New York, but if one is part of a system which extends west of Buffalo it naturally receives the bulk of the traffic originating on its western lines. You may say that the remedy lies in consolidating the other eastern line with some western road, but what will you do if no corresponding western road is available? May the remedy not be found in breaking up the system which extends both east and west of Buffalo, thus placing the lines east on an equal basis in competition for interchange traffic?

Other cases of weakness lie in lack of access to original sources of traffic (as distinct from interchange points) and lack of access to terminals at strategic points. One great factor in railway strategy lies in access to coal fields. This is the reason given for the control by the Pennsylvania of the Norfolk & Western. I submit that in not a few cases it will be found that the best way to give such access is to segregate the coal branches and to leave them free to serve on equal terms all carriers with which they may connect.

In the same way, the problem of terminals will never be solved except by separation of terminal properties and the establishment of a system of open terminals. If a desirable

road is weak because of lack of suitable terminals, give it access on fair terms.

As already suggested, cases will be found in which the sound reorganization policy would make a weak road strong without any consolidation whatsoever.

Purpose Should Be to Eliminate Weakness

It is important to keep in mind that our purpose, after all, is not to eliminate weak roads, but to eliminate weakness. If more thought were given to removing causes of weakness and less to finding a victim for the Erie, we would act more wisely.

I firmly believe that it is a vital need that we should have a careful and detailed analysis of the causes of weakness in each individual case before we proceed further with the so-called plan of consolidation. If we were to give as much study to the weak roads as we have given to the plight of the wheat farmers we might be well on the way towards accomplishing something.

(5) When, and not until when, we have ascertained the cause of weakness of each weak road and have determined the best way to remedy that weakness, then we will be in a position to construct a consolidation scheme which will have a logical connection with the great purpose at which we are aiming.

I have suggested that in some cases the logical way to remedy weakness may be to raise rates. There is much the matter with our rate regulation besides the difficulty arising from the existence of weak lines. Eliminating weak lines will not go very far after all towards improving our rate structure. The fundamental weakness, in my judgment, lies in the lack of a sound principle of rate making and in the insidious influence of political considerations. Too often it seems that the Interstate Commerce Commission forgets that transportation is a business and requires to be run on a business basis as much as do farms and factories. The tendency seems to be growing to make the railways an agency for furnishing relief to suffering farmers or lumber men. How can we expect to get rid of weak roads if we are to transfuse the blood of the carriers for the benefit of other weak industries?

Under this head of rates, too, should be mentioned the situation under the long-and-short-haul clause. The sooner the commission recognizes that relief is called for in the case of the transcontinental roads and probably a good many others, the sooner will one source of weakness be removed.

Preservation of Competition

The preservation of competition is an important part of the consolidation program. While it is perhaps most frequently regarded as a mere negative or limiting provision, I think that in reality it may be regarded as one of the great purposes of the plan. It should be so. A wise and elastic plan of consolidation might be made the means of preserving such competition as can exist in railway transportation, thus insuring the best results under the regime of private ownership and operation. By eliminating the sources of weakness and giving greater equality of opportunity we would be increasing the power of the carriers to compete.

There is a logical procedure here which is just as fundamental to a successful program as is the procedure which I have outlined in discussing the problem of the weak roads.

(1) The first step should be to analyze competition—to inquire what kinds of competition can exist normally among railways. Railways are only partial natural monopolies. In reality there is a larger amount of competition in the railway business. It is true that there can be little direct competition in rates among railways serving common points. One of the most notable developments shown in the Transportation Act of 1920 is the recognition of this fact as seen in the encouragement of consolidation and the permission

of pooling. In seeking to preserve competition, therefore, the consolidation plan is both inconsistent and economically unsound in that it considers direct competition in rates between parallel roads.

But there is real effective competition between rival markets or rival producing centers, which competition affects the carriers which serve such markets or centers. There is also competition in service which indirectly affects rates. Finally, there is competition between the railways and water ways and highways. It is these kinds of competition which should be safeguarded and preserved.

(2) The second step in a logical procedure designed to attain the purpose of the act with reference to competition, therefore, is to *determine exactly at what points in the transportation field the desirable kinds of competition exist.* To mention but a single case, it would be found that a long-continued and healthful competition has existed between points in Central Freight Association Territory, such as Chicago, and points in Trunk Line Association Territory, such as New York, for the markets of the Southeast, such as Atlanta. Everyone knows of the rivalry among the various ports for export and import trade, a rivalry which has grown in extent with the development of the South. Many of the chief reservoirs of the heaviest items of railway tonnage are competitive, as is the case with lumber and grain.

As far as I know, no study has been made to determine exactly what kinds of competition in railway service were economically desirable and exactly how consolidation would affect such competition. Obviously, however, such competition touches in an important way the matter of initiative in management and is of vital concern if we are to secure the full benefits of private ownership and operation. Consolidation, by increasing size and decreasing number, may reduce responsiveness to local requirements and dull the force of initiative. This is what many shippers fear.

(3) The third step, after having determined what kinds of competition are desirable, and where they should be encouraged, would be to *determine how consolidation can foster them and where consolidation might destroy them.* Judging by what I can learn of the procedure thus far there has been little more than a vague, general assumption that railways which occupy the same general territory are potentially competitors, and if two or three separate systems are preserved within the same part of the country, the purpose of the law with reference to competition is attained. In view of the foregoing analysis such simplicity of treatment seems almost naive.

Competition Among Markets

Probably the most important kind of competition in the railway business is that derived from competition among markets and to illustrate the bearing of my remarks on the consolidation problem I will refer to one or two major cases. It has been proposed to consolidate the Illinois Central and the Seaboard Air Line. One of these roads connects the Southeastern territory, centering in Atlanta, and the Northeast. The other connects Southeastern territory with Chicago. Thus these roads are the agents of rival commercial centers and their dependence upon the traffic of such centers has the effect of making them competitors. If the two are combined this kind of competition will inevitably be dulled and the tendency will be to make rates between the two northern competitive markets and the Southeast which will not be the lowest possible rates. Competition in service would also be affected.

In fact, instead of consolidating the Seaboard Air Line and the Illinois Central it would seem more logical to separate the Louisville & Nashville from the Atlantic Coast Line.

The rivalry among the North Atlantic ports furnishes an-

other illustration of the way in which the tentative plan of consolidation threatens market competition. In the past, each of these ports except Boston has been served by a great independent railway system, dependent upon the traffic of the port, and thus reflecting the clash of interests among the ports themselves. It seems to me that the competition among markets thus preserved has been desirable and has been a benefit to the whole country. I am further inclined to think that the tentative consolidation plan is undesirable to the extent that it reduces this competition, and that it fails to accomplish all that might be expected in not increasing the competition among the ports.

To be specific, the proposal to give the Central of New Jersey to the Baltimore & Ohio thus reducing the dependence of the latter upon Baltimore, by giving it an interest divided between Baltimore and New York, is a step in the wrong direction. Also the proposal to consolidate most of the New England railways fails to recognize the interests of Boston and Portland, and, I believe the best interests of New England. Boston has been steadily losing out as a center of export and import traffic, largely because she has no independent trunk line connection. It would be much better in the long run to link the Boston & Maine with the best possible line or combination of lines between its western gateway at Mechanicsville and Buffalo.

I find no evidence that serious attention has been given to the desirability of separating the Boston & Albany from the New York Central and providing for it some western connection which would give New England trunk line service independent of New York connections. (If the Wabash can be incontinently divided up, I fail to see why there is anything impossible in lopping off a few miles from the great New York Central system.)

These steps would not only in the long run benefit New England, but would benefit the entire country by maintaining free competition among the ports.

I will only mention as one other case the situation in the Southwest. Kansas City and St. Louis are rival centers, both as to origins and destinations for traffic between the Gulf and the North. If market competition is to be preserved they should be served by independent lines to the south and consequently there is much to be said against some of the proposals for consolidation such as that which would put Kansas City Southern together with the Missouri Pacific. The point is that Kansas City and St. Louis should have separate lines running to the Gulf ports, lines which would have an undivided interest in the individual development of each gateway.

In general, it would seem that in the interest of preserving market competition it would be well to attempt to give each main competitive center of basic originating traffic and each important distributive gateway at least one independent line and preferably two or more. This does not mean that in addition there might not well be allowed other systems which might serve both competitive points.

End-to-End Consolidations

Closely connected with the idea of market competition is the question of the relative advantages on the one hand of the proposed long end-to-end consolidations such as those between Chicago and New York or between Chicago and Galveston, and, on the other hand, of allowing the continued existence of a number of unconsolidated lines reaching halfway from these terminal cities and connecting at intermediate points to make joint through routes. It is proposed to consolidate various roads east of Buffalo with various roads west of that point to make new trunk lines between North Atlantic ports and Chicago. It is also proposed to consolidate several roads lying between Chicago and St. Louis and the Gulf to make through Chicago-Gulf systems. I am very doubtful about the wisdom of this general plan, as

it seems to me that through routing with a choice of several connecting lines at some intermediate point may be preferable. To consolidate lines between Chicago and New York or between Chicago and the Gulf would cause the consolidated system to haul the traffic originating at one end of its line through to the other end without any real alternative of utilizing other routes at the intermediate point. It seems certain, however, that it is impossible to give every system an equally good connection. Also the through consolidation would make it more difficult to equalize the flow in traffic. In general the very fact that groups of independent lines east and west of Buffalo and north and south of St. Louis have continued to exist is evidence that that arrangement is best and certainly puts a heavy burden of proof on one who would consolidate them.

It seems to me desirable that at such gateway points as Buffalo and St. Louis there should continue to be independent halfway lines which can interchange freely with one another at the intermediate point. This insures elasticity of routing and incidentally is conducive to the maximum of competition.

I may say parenthetically that the weakness of the Erie is, in my judgment, not due to the need of other routes between Buffalo and New York or to the lack of a line to St. Louis. On the other hand, such roads as the Lehigh Valley and the Lackawanna are doing very well as they are.

It is the best judgment of the best informed men that none of the proposed new trunk lines would be comparable in strength with the New York Central or the Pennsylvania. If the Erie needs a financial reorganization, let there be such a reorganization, but why force an unnecessary and undesirable consolidation? The only practical suggestion for a consolidation that would really strengthen the Erie I have seen is to join it with the Chicago & Eastern Illinois.

Similarly, the Chicago & Eastern Illinois and the Chicago & Alton between Chicago and St. Louis or Kansas City apparently do not need or desire the consolidation with the southwestern lines. There are many objections to carrying the southwestern lines through to Chicago, such as injury to the interests of the Missouri river towns and St. Louis, increased congestion at Chicago, a tendency to increase the length of haul on freight between the Southwest and East, etc.

Open Bridge and Terminal Lines

This line of reasoning suggests what is one of the vital weaknesses of the tentative plan of consolidation, namely, its unreasonable attempt to force numerous bridge and terminal lines into the single ownership of some one of a limited number of systems. In a natural development of the railway net of the country certain carriers have developed as bridge lines. That is, they have not become great "through" systems but have taken on the function of connecting strategic interchange points or sources of traffic, serving as a bridge for a number of lines. Thus the Chicago & Eastern Illinois connects with several southwestern lines at its Thebes gateway and serves as a bridge between them and Chicago. The Richmond, Fredericksburg & Potomac bridges the distance between the Richmond terminal of the Seaboard Air Line and Atlantic Coast Line and Washington. A score of other illustrations might be given, including such roads as the Delaware & Hudson, the Philadelphia & Reading, the Denver & Rio Grande Western, etc. These are generally short lines.

I submit that when a railway has clearly taken on the nature of a bridge the only logical way to treat it is to keep it open to all its connections. If you give the bridge to one of its connections it is highly improbable that the others will be able to secure equally good connections.

It may be desirable to encourage equal opportunity by

providing for joint ownership of the bridge line by all the connecting lines, but it seems that it is overworking the idea of a limited number of systems to give bridge lines to any one of the connecting lines. The resulting systems may seem more symmetrical on the map, but, whether judged from the point of view of strength or of competitive power, the result would in many cases be inequality. Symmetry without equality is of no avail, and symmetry at the expense of competition is harmful.

In my opinion any plan of consolidation which does not take into consideration the terminal problem is bound to be unsatisfactory. As railways are consolidated their terminals at strategical points should be thrown open for joint use, thus equalizing the opportunities of the consolidated groups and insuring the most effective utilization of terminal properties in the public interest. Consolidation may actually aggravate the problem such as exists at New York, Norfolk, and other points. For example, I believe that to give the Baltimore & Ohio solely the terminal facilities of the Central of New Jersey would be to the detriment both of a considerable number of railways which serve the port of New York and of the port itself. The wisest solution of the long run would be to put the operation of the whole terminal plant in the hands of an organization controlled by all the railways in common—possibly with some participation by representatives of the public.

Danger of Rigidity

One of the greatest dangers in the consolidation plan lies in its rigidity. In the western half of the country, at least, the railway map is not yet made. The channels of trade are not established. There will certainly be great changes in the future. It therefore seems unwise in the extreme to determine upon any limited number of systems in the western section at this time.

One point in the proposed plans that has impressed me is the absence of an independent north and south system west of the Mississippi river. In the southeast the general direction of traffic is north and south, and the Illinois Central constitutes an important north and south system in the Mississippi valley. In just the same way it is rather probable that north and south systems should be provided to connect the southwestern Gulf ports with the Missouri river valley. Such systems would reach up from the Gulf to the north and northwest via such points as St. Louis, Kansas City, Omaha, and Denver, much as the southern lines reach up to the Virginia cities and Ohio river crossings.

Another point of the same nature concerns the possibility of systems stretching west from the lower Mississippi river crossings. It now seems a far cry to any great development of this kind, but the population and industries of the southwest are not going to stand still. The time is not so far distant, possibly, when we will need east and west trunk lines in the South to connect Birmingham and other centers in the Southeast with the Southwest via Memphis and Vicksburg.

In spite of such possibilities, however, the plan of consolidation merely provides two great Chicago-Gulf systems with no arrangement either for independent north and south trunks or east and west lines.

These facts are here pointed out merely to illustrate concretely what I mean by the danger of going ahead with the scheme of compulsory consolidation at the present time. There should be greater fluidity in traffic and elasticity in the construction of trade routes. Where conditions are widely varied and especially where they are in a state of flux it would be the height of unwisdom to cast the railways into a few great molds which would only have to be broken as the different conditions existing on different parts of the systems caused strains and new trade developments required different channels.

Summary of General Principles

In order to sum up the foregoing thoughts I have endeavored to formulate a few general principles which should govern in the consolidation of the railways in this country. First, a few negative points:

(1) The size of a system is of no importance. In creating a limited number of systems some may have 20,000 miles of line and others 1,000, or less. Symmetry is not a source of strength.

(2) Weakness among railways is due to a variety of causes, many of which have no connection with consolidation and would not be removed thereby.

(3) Rates do not have to be made uniform for large territories. Simplicity in rate regulation is best secured not by making a few large systems which cover territories with diverse traffic problems, but by making smaller groups within which conditions would be more uniform.

(4) It should be clearly recognized that there are inconsistent elements in the bases proposed by Congress for consolidation, and there should be a logical and courageous facing of the problem. The Commission is directed to preserve existing channels of commerce as far as possible, but we know that it is just those channels which may be the source of weakness or the absence of competition. The same may be said of the injunction not to disturb corporate organization.

On the positive side, I would draw the following conclusions:

(1) A wise consolidation policy must recognize the different stages in the development of our railway net and traffic in different parts of the country. A large part of the country is not ready for a consolidation program. The most that should be done is to make an intensive study of the trend of traffic, just as one would do in city planning, to determine the tendencies and the apparently advantageous development and then guide voluntary consolidation.

(2) The bases for sound consolidation lie in the fundamental factors which make for profitable railway operation, namely, efficient management, advantageous routes, and access to adequate sources of originating and interchange traffic. These three things should be considered with reference to each consolidation proposed and unless these essentials can better be provided by consolidation the roads should be left alone.

(3) Open bridge and terminal lines are often desirable and consolidation should recognize this by leaving such lines, no matter how short, in an independent position—at least when they are profitable.

(4) To facilitate rate regulation, a plan for consolidation must carefully consider the different rate structures existing in various rate adjustment territories. By maintaining smaller rate territories it is possible to provide by local rate adjustments for lines which are and will long be fundamentally weak.

(5) To preserve competition, consolidation must pay chief attention to commercial or market rivalries among cities and producing areas and to this end important centers should be served by independent carriers.

The upshot of my examination of the question before us is that compulsory consolidation is undesirable and highly dangerous. There is no general advantage in consolidation as such. Indeed, in some cases breaking up systems would be conducive to strength and the preservation of competition. Symmetry, size, and rigidity are the bane of the consolidation craze. By all means, let us have a plan for the future growth of the nation's transportation, but let us be far-sighted, let us be practical. Let us have ideals—perhaps those sketched by Professor Ripley—but let us not shoot too soon.

Safety Education on the Union Pacific

By Leo F. Creagan

THE PURPOSE of this article is to indulge in a bit of pardonable boasting and also to smoke out the man who can beat the no-accident record achieved by the Colorado division maintenance-of-way department of the Union Pacific Railroad. For here is a railroad division of 880 miles of track that has turned over 11 clean pages and is entering upon the twelfth consecutive month of no reportable accidents to track, bridge or signal men.

At first glance this record may not seem remarkable, even though 123 track foremen with a daily average of 1,400 men are employed. The pick-and-shovel men, who are in the majority in the maintenance department, are not generally supposed to occupy very hazardous positions on the railroad firing line. In fact, the so-called common labor, in any industry, is thought to enjoy safer working environments than any other class. Facts, however, prove otherwise. For example, in the shops of the General Electric Company, where men work surrounded by high pressure steam, high voltage electricity, with tons of steel and cast iron being swung over their heads with electric cranes, the outside men, handling material, furnish 37 per cent of the accidents. The handling of material about powder plants causes more injuries than the dangerous explosive itself. Handling material causes many accidents; but here is a class of workers whose chief duty is handling material but who, apparently, have found safe methods.

Where is the operating man who has not exclaimed: "... but these men are ignorant; many of them cannot speak English! It is impossible to teach a man who cannot understand." ... ? But there are large numbers of foreign-speaking laborers employed on the Union Pacific, and the Colorado division, with an average labor turnover of 15 men a day, has no fewer than the other divisions. When a man enters the service he is given a book of safety rules printed in his own language. The nationalities, generally speaking, are segregated and there is at least one man with each gang of foreigners who can read his native language. Because it often happens that the safety book of rules is the only available reading material printed in the man's own language, he perforce, reads it. And, further, the English translation is contained in the book, and before long the only English the man knows is safety rules. Japanese, Mexican, Greek, no matter from whence the man hails, he is told in his own tongue how to work safely.

With the recently-arrived immigrant it is a proposition of "catch 'em while they're young"; before they acquire dangerous working habits; and when these men learn that their employers' chief concern is for their personal safety, we have not only excellent accident-prevention, but also a splendid incentive for good citizenship.

The campaign against a program of undue haste is vigorous. An instance may be found in the method of unloading new ties. The practice of stopping a work train at a high fill and throwing off a large number of ties at that point, for no other reason than that they will roll to the bottom without further handling, has been discontinued. Many accidents have occurred to section men on the wet or snow-covered or ice-covered side of embankments when engaged in recovering such ties. Ties are now stored in uniform piles and upon level ground and trucked to the desired location when needed. This practice is followed with all track and bridge material.

Trucking material on push cars recalls injuries caused by trains striking such vehicles. It is admitted that the opportunity is there, but on the records the accident is missing.

It has been three years since one of these "lorries" has been struck by a train on the Colorado division, and more than three years since a reportable injury has occurred in the Julesburg-La Salle roadmaster's forces. Just why these cars are not struck by trains is perhaps to be explained by the fact that education in safety is not confined to a single department but is enthusiastically pursued by every department.

Safety is said to beget safety. During the past year there was an unusual amount of rainfall east of the Rockies. Washouts, particularly within the cloudburst area, were numerous and destructive. It is worth recording, however, that all such washouts, without a single exception, were found by the track and bridge men patrolling the track, instead of by hapless trains. Many such washouts occurred during the night, but not a wheel left the track; and as a result 123 track foremen are wearing honor buttons. These men wear the honor button with pride, because it has a real meaning for them, a meaning not easy to describe but glorious to know.

How was it done, and who did it? In the opinion of the writer, the credit does not belong to any one man; though the superintendent, C. C. Barnard, of Denver, seems to possess that something which is often called leadership. But these conditions were brought about first, by a plan for safety, which, after much has been said, is nothing other than the simplest way of doing a job; and second, supervision; to see that this plan is carried out. Supervision with a two-story S; not spasmodic drives or meaningless preaching, but intensive, constant, persistent and consistent vigilance, with a determination to know that the plan was being adhered to.

Before the summer rains started the superintendent visited each section foreman and bridge supervisor; visited him "in the field," not in the office. This officer diplomatically examined the man on the rules, paying especial attention to track-patrolling during and after rains, flagging, slow orders, moving material and the like. He saw that each man had the necessary flagging equipment and suitable supplies of emergency material on hand. More; he saw that each man piled his ties just so many in a pile; and stowed his tools upon hand cars in a certain way; that all of the best prescribed practices were understood. By the time he had finished with the last man he went back to the first one and started again; and kept it up, day and night. Of course, he was not alone in his efforts. The division engineer, the general roadmaster, the district roadmasters, the assistant superintendent, the trainmasters and the safety agent were each actuated by a common impulse. All of them were inspired by a leader who seemed much more ready to rush out into a storm to see if every one was on the job, than he was to preach a sermon about safety. That is what made possible this record.

From whence springs this contagious enthusiasm? How did the boss get that way? Pride in his division, plus outside or public co-operation and approval, I think, is the answer. By which is meant that the attention and the interest of the community has been captured; and instead of the Union Pacific serving a hostile or unfriendly public one may find some of Denver's biggest public men taking an active part in the railroad's monthly safety meetings.

Two years ago these meetings were held in the superintendent's private office, with ample seating accommodations for all who wished to attend. When employees other than regularly appointed committeemen insisted upon attending, a larger room at a local hotel was secured. Within a year the attendance had grown to such proportions that to seat them the auditorium of the Denver Tramway building had to be secured.

Now it is not unusual to hear safety discoursed upon from Denver pulpits. One prominent minister who issues a small weekly paper to his congregation, published an article entitled "The Slaughter of the Innocents," using data secured when he attended a Union Pacific safety meeting. When the Denver Safety Council, which is affiliated with the National

Safety Council, was organized recently, a Union Pacific officer was elected vice-president and a Union Pacific employee was selected for chairman of the grade crossing section.

In conclusion it might be said that if railroad safety campaigns need any justification it can be found in the maintenance-of-way record on the Colorado division of the Union Pacific. Further, we may say that of all the avenues of approach to the public, the happy neutral ground of the safety field is superior to any other. There, we find petty differences and groundless suspicion laid to rest.

Freight Car Loading

WASHINGTON, D. C.

REVENUE FREIGHT CAR LOADING for the week ended February 9 was somewhat below that for the previous week but was still far above the figures for any corresponding week of previous years. The total was 906,489 cars, an increase of 57,137 as compared with last year and of 128,698 as compared with 1922. In the Northwestern and Southwestern districts, however, the loading was below that for last year. Coke was the only commodity to show a decrease as compared with the corresponding week of last year, while grain and grain products showed an increase of 5,605 cars, forest products an increase of 13,899 cars, and l.c.l. merchandise 18,168 cars. The summary as compiled by the Car Service Division of the American Railway Association follows:

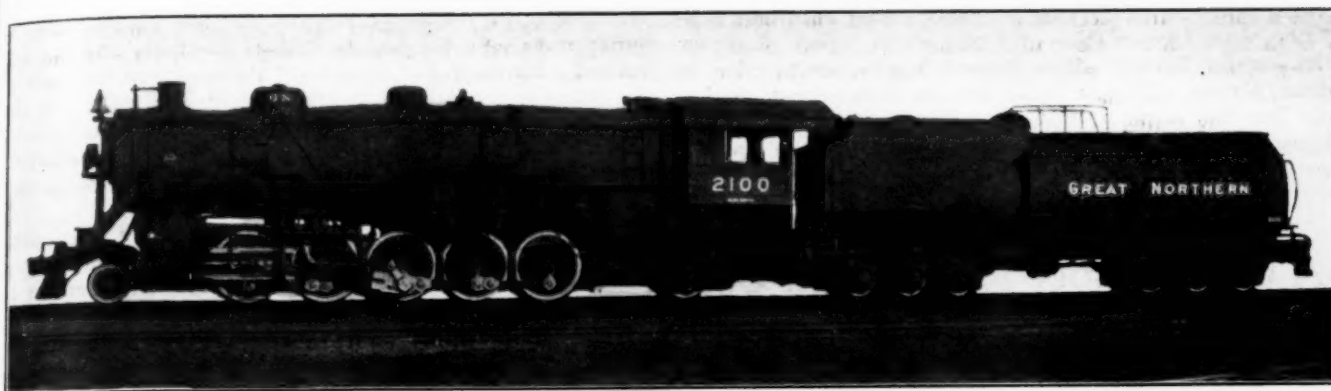
REVENUE FREIGHT CAR LOADING
Week Ended Saturday, February 9, 1924

Districts	1924	1923	1922
Eastern	222,116	207,866	192,578
Allegheny	190,954	184,928	159,518
Pocahontas	42,780	32,946	35,509
Southern	146,193	127,919	119,000
Northwestern	108,568	111,663	98,438
Central Western	137,271	135,913	120,491
Southwestern	58,607	50,117	52,257
Total Western Districts	304,446	295,693	271,186
Commodities			
Grain and grain products	46,471	40,866	54,009
Livestock	32,094	31,697	29,801
Coal	199,791	190,990	192,789
Coke	12,629	15,193	7,871
Forest products	77,962	64,063	51,984
Ore	9,753	9,432	4,061
Mdse. L. C. L.	234,380	216,212	221,381
Miscellaneous	293,409	280,899	215,945
Total	906,489	849,352	777,791
February 2	929,936	865,414	747,895
January 26	981,326	869,464	740,386
January 19	895,276	864,297	731,109
January 12	872,265	872,908	714,191
Cumulative loading to date	5,198,561	5,088,731	4,310,705

Car Loading in Canada

Cars of revenue freight loaded at stations in Canada during the week ended February 9 aggregated 51,606, being a decrease from the previous week of 814 cars and an increase of 6,685 cars over the same week last year. The loadings in the East decreased only 36 cars but in the West the decline was 778 cars. Coal loading fell off 735 cars in the West and 716 cars in the East, while grain loading showed increases. Merchandise cars increased 298 in the East but decreased 316 in the West.

By commodities the cars of revenue freight loaded at stations in Canada in the week ended February 9, as compared with the previous week, are as follows, respectively: grain and grain products, 9,120 and 8,910; live stock, 2,089 and 2,246; coal, 2,619 and 4,070; coke, 264 and 333; lumber, 3,149 and 2,921; pulpwood, 4,172 and 3,780; pulp and paper, 2,238 and 2,363; other forest products, 3,572 and 3,424; ore, 985 and 849; merchandise l.c.l., 12,739 and 12,757; miscellaneous, 10,659 and 10,767; total cars loaded, 51,606 and 52,420; total cars received from connections, 33,667 and 33,928; total cars loaded in corresponding week last year, 44,921 and 46,534.



Built by the Baldwin Locomotive Works for the Great Northern. Tractive Force Is 87,000 lb. Tender Carries 15,000 gal. of Water and 5,000 gal. of Oil

2-10-2 Type Replace Mallets on Great Northern

3,000 Tons Handled Over 1.8 Per Cent Grade by 2-10-2 Locomotives of 87,130 Lb. Tractive Force

THE GREAT NORTHERN, in order to take care of its increased freight business and to speed up freight traffic on its Rocky Mountain district, placed an order with the Baldwin Locomotive Works for 30 locomotives of the 2-10-2 type, known as Class Q-1, bearing the railroad numbers 2100 to 2129. Some of them have already been received and are being placed in service on the Kalispell division and assigned to the Rocky Mountain district.

They will replace Mallet type engines which have a total weight, engine and tender, of 642,200 lb. It is expected that these engines will materially speed up the freight business on the Rocky Mountain district, and thus permit the movement of an increased number of cars over the mountains.

As these locomotives were designed to handle fast freight trains of 3,000 tons over the mountains, they were specially fitted with tenders having 15,000 gal. water capacity to eliminate any stops for water while ascending the west slope of the mountains, where a grade of 1.8 per cent is encountered for 12 miles; over this district the trains will be double-headed, using two engines of this class, the helpers being equipped with boosters which will give them an added tractive force in starting of 10,000 lb. In eliminating the stop of two engines for water, a saving of time of from 40 to 50 min. will be effected. The maximum grade westbound over this district is one per cent.

The weight of the locomotive alone in working order is 422,340 lb., of which 342,490 lb. is on the drivers, 24,720 lb. on the leading truck and 55,130 lb. on the trailer truck, which is of the Delta type. The cylinders are 31 in. diameter by 32-in. stroke. The driving wheels are 63 in. in diameter and the boiler pressure, 210 lb. These locomotives have the unusually heavy rated tractive force of 87,130 lb. The driving wheel base is 22 ft. and the total wheel base is 42 ft. 7 in. for the engine, and for the engine and tender the total wheel base is 89 ft. 9 $\frac{3}{8}$ in.

All these locomotives are equipped to burn fuel oil. The fireboxes are fitted with brick arches, supported on five arch tubes. The boilers are of the Belpaire type, with combustion chambers 54 in. long. There are 270, 2 $\frac{1}{4}$ -in. tubes and 60, 5 $\frac{1}{2}$ -in. flues, 21 ft. long. The boilers are 102 in. in diameter at the back course, and 90 in. at the front course. The firebox has a width of 96 in. and is 132 in. long. They are equipped with Type A superheaters.

The tenders are of the Vanderbilt type with Commonwealth cast steel six-wheel trucks, and have a capacity of 15,000

gal. of water and 5,000 gal. of fuel oil. The brakes are of the clasp type.

Among the specialties which have not been mentioned are the Ragonnet reverse gear, Walschaert valve gear, Chambers

TABLE OF DIMENSIONS, WEIGHTS AND PROPORTIONS

Railroad	Great Northern
Builder	Baldwin Loco. W.ks.
Type of locomotive	Freight
Service	2-10-2
Cylinders, diameter and stroke	31 in. by 32 in.
Valve gear, type	Walschaert
Valves, piston type, size	15 in.
Weights in working order:	
On drivers	342,490 lb.
On front truck	24,720 lb.
On trailing truck	55,130 lb.
Total engine	422,340 lb.
Tender	286,160 lb.
Wheel bases:	
Driving	22 ft. 0 in.
Total engine	42 ft. 7 in.
Total engine and tender	89 ft. 9 $\frac{3}{8}$ in.
Wheels, diameter outside tires:	
Driving	63 in.
Front truck	33 $\frac{1}{2}$ in.
Trailing truck	42 $\frac{1}{2}$ in.
Boiler:	
Type	Belpaire
Steam pressure	210 lb.
Fuel	Oil
Diameter, first ring, outside	90 in.
Firebox, length and width	132 in. by 96 in.
Combustion chamber length	54 in.
Tubes, number and diameter	270—2 $\frac{1}{4}$ in.
Flues, number and diameter	60—5 $\frac{1}{2}$ in.
Length over tube sheets	21 ft. 0 in.
Grate area	88 sq. ft.
Heating surfaces:	
Firebox, comb. chamber and arch tubes	477 sq. ft.
Tubes and flues	5,134 sq. ft.
Total evaporative	5,611 sq. ft.
Superheating	1,518 sq. ft.
Tender:	
Style	Vanderbilt, 6-wheel truck
Water capacity	15,000 gal.
Oil capacity	5,000 gal.
General data estimated:	
Rated tractive force, 85 per cent.	87,130 lb.
Cylinder horsepower (Cole)	3,630
Weight proportions:	
Weight on drivers ÷ total weight engine, per cent.	81.2
Weight on drivers ÷ tractive force	3.93
Total weight engine ÷ cylinder hp.	116.3

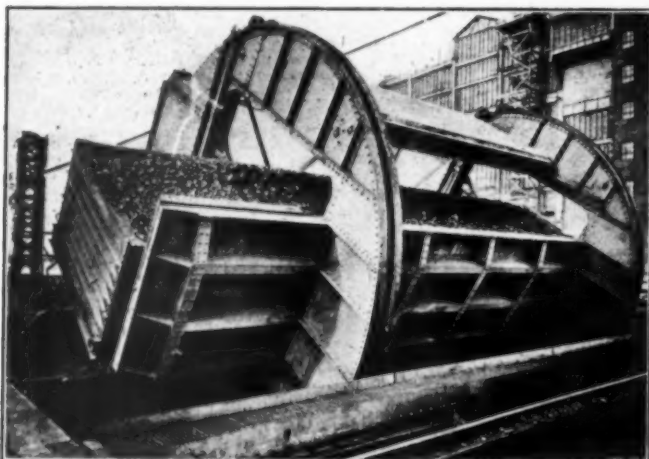
outside type throttle valve, Consolidated safety valves, Great Northern flange oilers, Franklin automatic adjustable driving box wedges, New York schedule 6-ET air brake with two 8 $\frac{1}{2}$ -in. cross-compound air compressors, King metallic packing, Hunt-Spiller cylinder and valve chamber bushings, floating bushings in all side rod connections, Detroit lubri-

cators, Ashcroft steam gages, Pyle-National headlight generator with Golden glow reflector, Unit safety drawbar, McLaughlin flexible joints between engine and tender in steam, air and oil lines; Miner friction draft gear on tender, and Imperial Type B uncoupling attachment. The leading dimensions, weights and proportions are shown in the accompanying table.

A Car Dumper for General Use

IT IS THE PREVAILING impression that the car dumper is of practical application only at rail-water terminals or other points where coal is unloaded in solid trains rather than by individual cars. For this reason it has not been considered seriously for coaling stations or mechanical coal handling plants at large power stations. However, the results obtained with a new type of car dumper installed at a plant of the United Electric Light & Power Company of St. Louis, by the Link-Belt Company, Chicago, suggests the opportunity for a more wider utilization of this form of car unloader by the railways and other industries.

As only a small proportion of the power plant in question is now in service, the present daily coal consumption is only about eight car loads so that the dumper is operated only a few minutes each day, but it is the opinion of those in charge that the installation can be justified for a daily service involving little or no increase over the number of cars now being handled. Experience with the equipment since its installation shows that it is capable of dumping a 50-ton car of coal in one min. and 10 sec., while attended by only one



A Side View Showing the Early Stage of the Dumping Operation

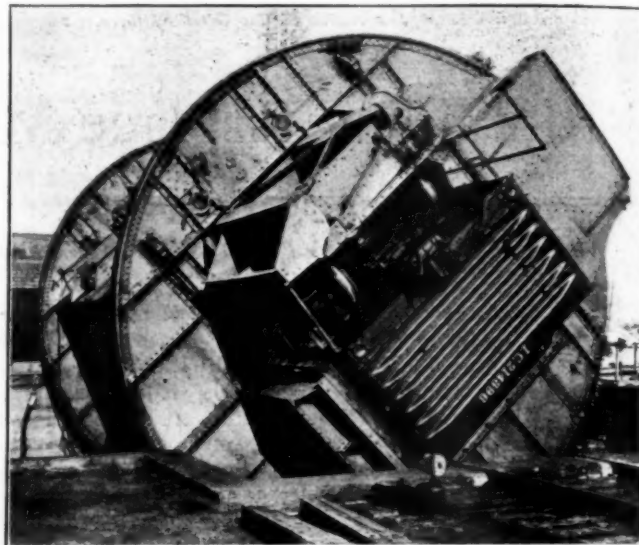
man and with a power consumption involving only that for the operation of one 35-hp. motor.

The car dumper is made up of two separate structures, one comprising the two roller rings 24 ft. in diameter and the other the transfer table or platen upon which the car stands. The transfer table is supported inside the rings by means of four rollers operating on four wedge shaped beveled castings attached to the underside of the transfer table.

The bevel of these castings is such that the transfer table with its car would naturally run over to the side support but it is prevented from doing this by means of two hook-shaped castings which engage rollers attached to the abutments at each end of the table. Because of this arrangement the first part of the rotating action of the two-roller rings results in a motion relative to the transfer table, that is, the table stands still until the roller rings have moved far enough to bring the side bearing in contact with the side of the car.

After that the transfer table and car are turned with the roller rings. In the reverse motion the table and car are rotated with the roller rings until the hooks on the ends of the transfer table come in contact with the rollers on the abutments, thereby causing the car and transfer table to stand still while the rings complete their motion, with the effect of separating the car from the side bearing, and affording sufficient clearance for it to be rolled off the table.

The operation of the car dumper is entirely interlocked and automatic except for the starting and stopping of the rotating motor with the aid of a drum type controller. It is impossible for the operator to perform the cycle of operations in any other but the correct order. The supporting of the car at the dumping side and the clamping at its top are both



End View After the Dumping Was Completed

automatic and their operation depends solely upon the rotation of the dumper.

Another feature of this dumper is the placement of the counterweights. Extreme care was used in determining the amount and correct location of the counter-weights used and the result has been the minimizing of the power requirements. The rotating motor is of 35 hp., but the entire structure is so well balanced that ammeter readings, which have been taken, indicate that the size of motor furnished is in excess of the actual power required.



South African Railways' Offices, Bloemfontein

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Compound vs. Simple Locomotives in France*

Tests of Pacific Locomotives in Express Service on P. L.
& M. and P.-O. Show Economy of Compounds

By M. Vallantine

Chief Engineer of Motive Power, Paris, Lyons and Mediterranean

THE PARIS-ORLEANS RAILWAY in 1921 placed in service 50 Pacific type locomotives having simple cylinders and equipped with superheaters. These locomotives were built by the American Locomotive Company and conformed in general to American practice. They weighed 201,000 lb. in working order, had cylinders 24.4 in. by 25.6 in., 76¾ in. driving wheels and carried 171 lb. boiler pressure.

A description of these engines, together with the results obtained in service in comparison with previous Paris-Orleans four-cylinder compound locomotives, was given in the July, 1923, issue of the French publication, *Revue Generale des Chemins de Fer et des Tramways*. The article referred to was written by M. Lunier, inspector of equipment, Paris-Orleans railway. An abstract of this article was translated and appeared in the October 13, 1923, issue of the *Railway Age*. The service tests made on the Paris-Orleans railway in 1921 showed that the two-cylinder simple locomotives consumed 5.26 per cent less fuel than the four-cylinder compound locomotives, both being used in the same fast passenger service. The degree of superheat was somewhat higher, however, on the simple locomotives, the average steam temperature recorded being 642 deg. F. against 556 deg. F. for the compound locomotives. The simple locomotives had 775 sq. ft. of superheating surface and the compound locomotives, 684 sq. ft. The fact was also brought out that the internal friction was appreciably less for the simple than for the compound locomotives. Furthermore, the simple locomotives required comparatively little maintenance.

The readers of the *Railway Age* doubtless will be interested in a subsequent series of service tests conducted on both the Paris, Lyons and Mediterranean and on the Paris-Orleans railways in 1923, comparing the Paris-Orleans two-cylinder simple locomotives referred to and the four-cylinder compound Pacific locomotives used extensively on the Paris, Lyons and Mediterranean for hauling all its express and fast passenger trains.

The joint tests were undertaken at the suggestion of the P. L. & M. Upon request, the P.-O. delivered to the P. L. & M. five two-cylinder simple locomotives of the 3591-3640 series, and in exchange received five four-cylinder compound Pacific type locomotives of the 6300 series. The five P.-O. simple locomotives turned over to the P. L. & M. were delivered to the Avignon engine terminal and with five P. L. & M. compound locomotives, already in service at this point, were formed into a fleet. In a similar manner, the P.-O. took the five P. L. & M. compound locomotives which it received, and placed them in a fleet with five P.-O. simple locomotives already in service out of Paris.

By exchanging locomotives and assembling them into fleets with an equal number of home road locomotives and by keeping all locomotives on runs where service conditions would be as nearly identical as possible, a fair comparison was assured.

The P. L. & M. locomotives referred to have not been

described in the *Railway Age*, although a photograph of one was shown in the January 5, 1924, issue, page 103. Some tests of a previous lot of similar Pacific, 6,200 class, were given in the issue of September 30, 1922. The leading

PRINCIPAL CHARACTERISTICS OF PACIFIC LOCOMOTIVES TESTED

Road	P.-O.	P. L. & M.
Kind of locomotive.....	2-Cylinder simple	4-Cylinder compound
H. P. cylinder, diameter and stroke.....	24.4 in. by 25.6 in.	17.3 in. by 25.6 in.
L. P. cylinder, diameter and stroke.....	25.6 in. by 25.6 in.	
Weights in working order:		
On drivers.....	116,500 lb.	122,250 lb.
On front truck.....	47,500 lb.	47,300 lb.
On trailing truck.....	37,500 lb.	35,750 lb.
Total engine.....	201,000 lb.	205,300 lb.
Wheel bases:		
Driving.....	13 ft. 4 in.	13 ft. 9.2 in.
Total engine.....	36 ft. 7½ in.	36 ft. 10 in.
Wheels, diameter outside tires:		
Driving.....	76¾ in.	78¾ in.
Front truck.....	38¾ in.	39¾ in.
Trailing truck.....	48¾ in.	53½ in.
Boiler:		
Steam pressure.....	171 lb.	231 lb.
Tubes, number and diameter.....	165—2 in.	143—2½ in.
Flues, number and diameter.....	26—5¾ in.	28—5¼ in.
Length between tube sheets.....	19 ft. 10½ in.	19 ft. 8 in.
Grate area.....	50.6 sq. ft.	45.7 sq. ft.
Heating surfaces:		
Firebox.....	154 sq. ft.	169 sq. ft.
Tubes and flues.....	2,248 sq. ft.	2,200 sq. ft.
Total evaporative.....	2,402 sq. ft.	2,369 sq. ft.
Superheating.....	775 sq. ft.	760 sq. ft.

COMPARATIVE PERFORMANCE ON THE PARIS-ORLEANS

Date	Mileage	Av. load tons	1,000 ton-miles	Fuel, tons	Av. coal, lb. per mile	Av. coal, lb. per 1,000 T.-M.
1923						
P.-O. Simple Locomotives, Series 3600						
May	18,750	503	9,410	511	54.5	108.4
June	16,120	498	8,030	423	52.5	105.3
July	12,760	485	6,180	349	54.7	113.1
Total....	47,630	496	23,620	1,283	53.9	108.7
P. L. & M. Compound Locomotives, Series 6300						
May	26,230	495	12,970	620	47.2	91.0
June	24,070	511	12,275	560	46.5	91.2
July	20,900	505	10,530	499	47.7	94.8
Total....	71,200	503	35,775	1,679	47.2	93.9
Excess fuel consumption per mile by simple locomotives—14.3 per cent.						
Excess fuel consumption per 1,000 ton-miles by simple locomotives—15.8 per cent.						

COMPARATIVE PERFORMANCE ON THE PARIS, LYONS & MEDITERRANEAN

Date	Mileage	Av. load tons	1,000 ton-miles	Fuel, tons	Av. coal, lb. per mile	Av. coal, lb. per 1,000 T.-M.
1923						
P.-O. Simple Locomotives, Series 3600						
May	14,470	454	6,560	383	52.9	116.9
June	14,630	467	6,830	412	56.4	120.3
July	7,990	470	3,750	243	58.6	124.8
Total....	37,090	463	17,140	1,029	55.5	120.0
P. L. & M. Compound Locomotives, Series 6300						
May	20,420	479	9,780	437	42.8	90.2
June	18,160	477	8,655	413	45.4	95.5
July	21,000	492	10,325	470	44.8	91.0
Total....	59,580	483	28,760	1,320	44.3	91.9
Excess fuel consumption per mile by simple locomotives—25.1 per cent						
Excess fuel consumption per 1,000 ton-miles by simple locomotives—30.5 per cent.						

dimensions and weights of the two types of locomotives tested are given in an accompanying table.

The tests were run for a period of three months—May, June and July, 1923. Records were kept of the mileage, weight of trains and fuel consumed. A summary of the

*Translated and prepared from data furnished by Mr. Vallantine. For convenient reference, all dimensions and weights have been converted by slide rule from metric to American measurements.

results obtained on both roads is given herewith. In the tests made on the Paris-Orleans railway, it was found that the simple locomotives consumed 14.3 per cent more coal than the compound locomotives for an equal mileage and 15.8 per cent more coal for an equal ton-mileage. In the tests made on the Paris, Lyons & Mediterranean railway, it was found that the simple locomotives consumed 25.1 per cent more coal than the compound locomotives for an equal mileage and 30.5 per cent more for an equal ton-mileage. These tests would appear to establish clearly the fact that the P. L. & M. compound locomotives were more economical of fuel than the P.-O. simple locomotives.

Safety Regulations at Railroad Grade Crossings

AMONG THE NUMEROUS and varied discussions of this perennially prominent subject, one of the most detailed and careful recent utterances is that of Charles E. Hill, general safety agent of the New York Central Lines, who gave an address before the Michigan Conference on Highway Engineering, held at Ann Arbor on February 12. The address has been printed in a 25-page pamphlet which, no doubt, can be had from Mr. Hill, whose office is at 466 Lexington Avenue, New York City.

He begins with a brief survey of the broad general "accident problem" calling attention to the fact that 76,000 persons are killed in the United States and more than 2,000,000 injured, each year, as the result of "accidents;" and 25 per cent of these victims are children under 15 years of age. The total number of soldiers, sailors and marines from this country killed in the 19 months of the Great War was about 57,000 and of wounded 126,000; but in a period of 19 months following the war, there were twice 57,000 killed in this country in connection with the peaceful pursuits of our daily toil.

Highway grade crossings in the United States now number 256,362, and by the end of this year the number of

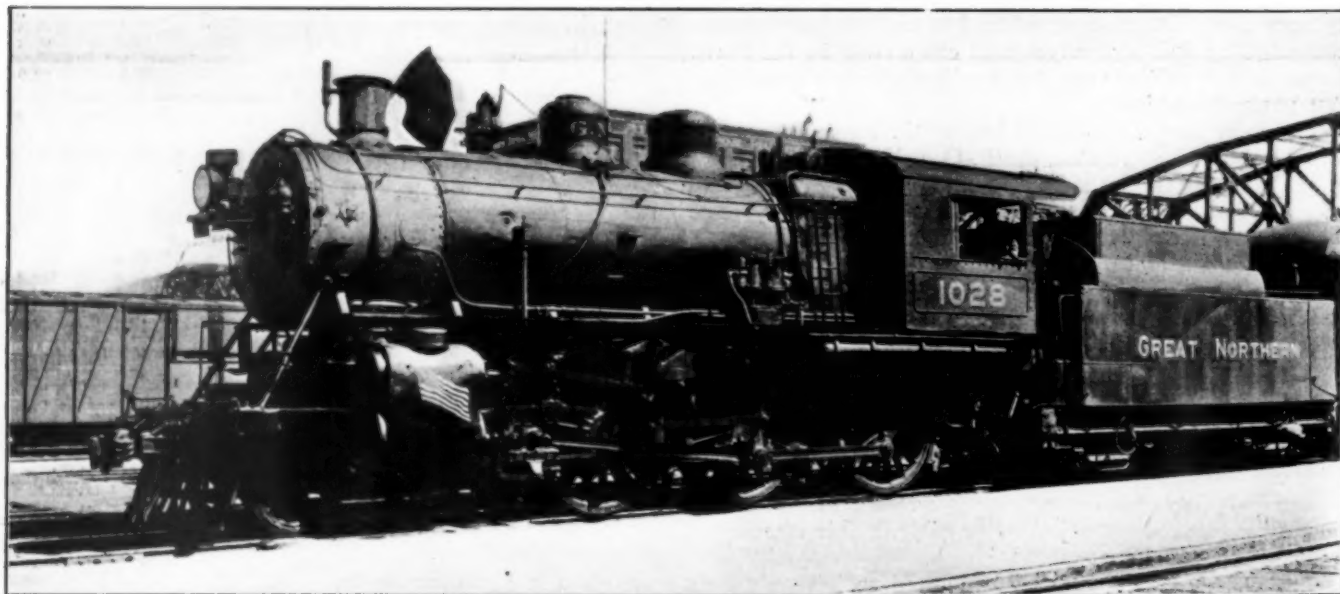
licensed automobiles will be about 15 millions, indicating, so far as can be judged by past records, that 2,500 persons will be killed at crossings this year; and 6,500 will be injured. (A point not mentioned by Mr. Hill is that probably 10,000 persons will be killed in automobile accidents at other places than crossings.)

In 1898 the number of persons killed at grade crossings in the United States was 675; but, says Mr. Hill, although men were careless, then the same as now, "the judgment of the horse prevailed."

In discussing the question, What is the remedy for the automobile danger, Mr. Hill lays special stress on the joint responsibility of the railroads, the state and municipal governments, and the owners of automobiles. He describes what the American Railway Association has done. The electric flashlight, two red lights 28 in. apart, side by side, fixed on a post 7 ft. above the ground, is a standard signal which has been approved by the American Railway Association, and the New York Central is endeavoring to carry out the standards of the association where practicable.

A large number of accidents can be charged to intoxication of drivers, which, says Mr. Hill, indicates a serious lack in our laws; but his only proposal for a cure of this feature is stricter examinations for licenses. He assumes that judging by past observations, about 25 per cent of drivers passing over a given crossing will fail to use reasonable care, and 5 per cent are to be classed as extremely reckless. This last percentage indicates that there are now 750,000 reckless drivers in the country, all of whom are potential train wreckers. Mr. Hill thinks that the laws requiring motors to stop at crossings have effected a marked reduction in the number of casualties, and he thinks it will be well to give serious consideration to the proposition to require all automobiles, everywhere, to stop before attempting to pass over an unprotected crossing.

Summing up, the author calls upon public officers in control of highways to co-operate with the railroads in standardizing protection at crossings; to actively support proper legislation; to exclude unfit persons from driving automobiles and to make a comprehensive study of the entire problem from an unprejudiced standpoint.



International

Cylinders of Great Northern Locomotive Which Drew the Late President Harding's Train on Westward Journey Decorated with American Flags Making Locomotive Traveling Monument to His Memory

Study of a Large Terminal Develops Basic Data*

Origin-Destination Survey Made at New Orleans May Be Applied to Other Large Railway Centers

By J. Rowland Bibbins
Consulting Engineer, Washington, D. C.

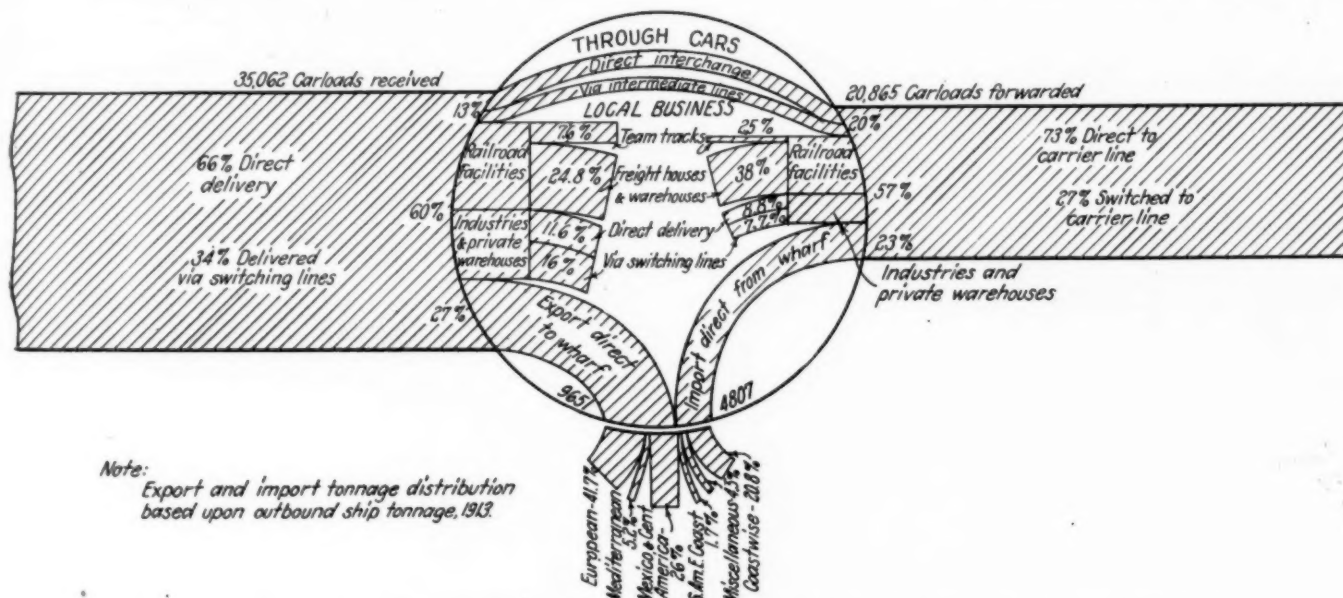
WHAT GOES ON INSIDE of a large port terminal? How do cars move? Where are the heaviest traffic zones? What is the source of congestion? How can the capacity of existing facilities be increased? What are the general lines of best future development?

Answers to these and other questions were obtained in a study of the Port of New Orleans, which embraced the first comprehensive origin-destination survey of public record covering all rail and marine traffic moving within a port terminal for a typical month. This survey followed every car to its destination, showed the actual distribution of all of this traffic, inbound and outbound, the large movement within the terminal, the small volume of through rail

New Orleans is Outlet for a Vast Area

New Orleans occupies a strategic position as the principal water-gate to the Mississippi water shed, which comprises an area of over 1,700,000 sq. mi., containing 70 per cent of the farm acreage and 51 per cent of the population of the United States. This valley produces from one-half to three-quarters of the wheat, corn, live stock, wool, petroleum, lumber and bituminous coal of the nation. Navigation of its principal waterway has witnessed both a rapid rise after the Civil war, and then a gradual decline until again brought forcibly into demonstration by the transportation shortage of the recent war.

Curiously enough, not one railroad trunk line today runs



A Flow Diagram Showing the Disposition of All Freight Entering the Terminal in November, 1915

freight interchanged, the larger volume of through freight sent overseas and the importance of warehousing in the transit movement. The survey was made for the Public Belt Railroad Commission as part of the work of its Board of Advisory Engineers (consisting of Bion J. Arnold, chairman, Dr. J. A. L. Waddell, J. Vipond Davies and A. F. Barclay, secretary,) by the author as resident engineer representing the chairman. After an inquiry into the history, present status, organization and intra-port operations of the five great railroad systems serving the New Orleans rail heads, this terminal study furnished a definite basis for replanning the future development of the whole port terminal in its main features, as well as the planning of special facilities for the Public Belt railroad development, incorporating a new all-rail crossing of the Mississippi river at New Orleans, either by bridge or tunnel, to avoid the car ferries now used.

from New Orleans, the second port of the country, directly into and through the great northwest, although New Orleans is pre-eminently a grain as well as a cotton port. A study of the railroad systems entering the 400-mile zone centering in New Orleans reveals that the elements of this northwest railroad development already exist to some degree although much needs to be done to perfect this system, especially through eastern Texas and northwest.

The Situation Within the Terminal District is Unique

The railroads have developed in New Orleans largely in a competitive way, with main lines and terminals interlocking and overlapping in the effort to maintain control of the terminal and the traffic which comes to the roads thereby. Moreover, interchanges were located for the most part within the congested zone, each road shifting the cost of switching haul off its own lines as much as possible, with an extraordinary amount of dead switching movement as a result.

The Public Belt railroad traverses the entire water front, with connections to all roads and important water front in-

*Abstracted from an address before the twelfth annual convention of the American Association of Port Authorities at New Orleans, La., December 10, 11 and 12, 1923.

dustries, warehouses and elevators and has effected a vast improvement in the handling of intra-terminal business in the port of New Orleans at moderate cost. Under the basic law of the state, derived from the old Napoleonic Code, the state reserves fee title in the batture or water front, as a result of which New Orleans has developed the great system of public wharves and warehouses. Years ago, the railroads were established by leaseholds, but within the last few years the city found it expedient to take the first steps toward unifying the control of this water front service through the agency of its own Public Belt railroad, operated not for profit but as an open highway or neutral agency for the receipt, delivery and interchange of freight to and from any and all carriers, rail and water.

The Organization of the Terminal Survey

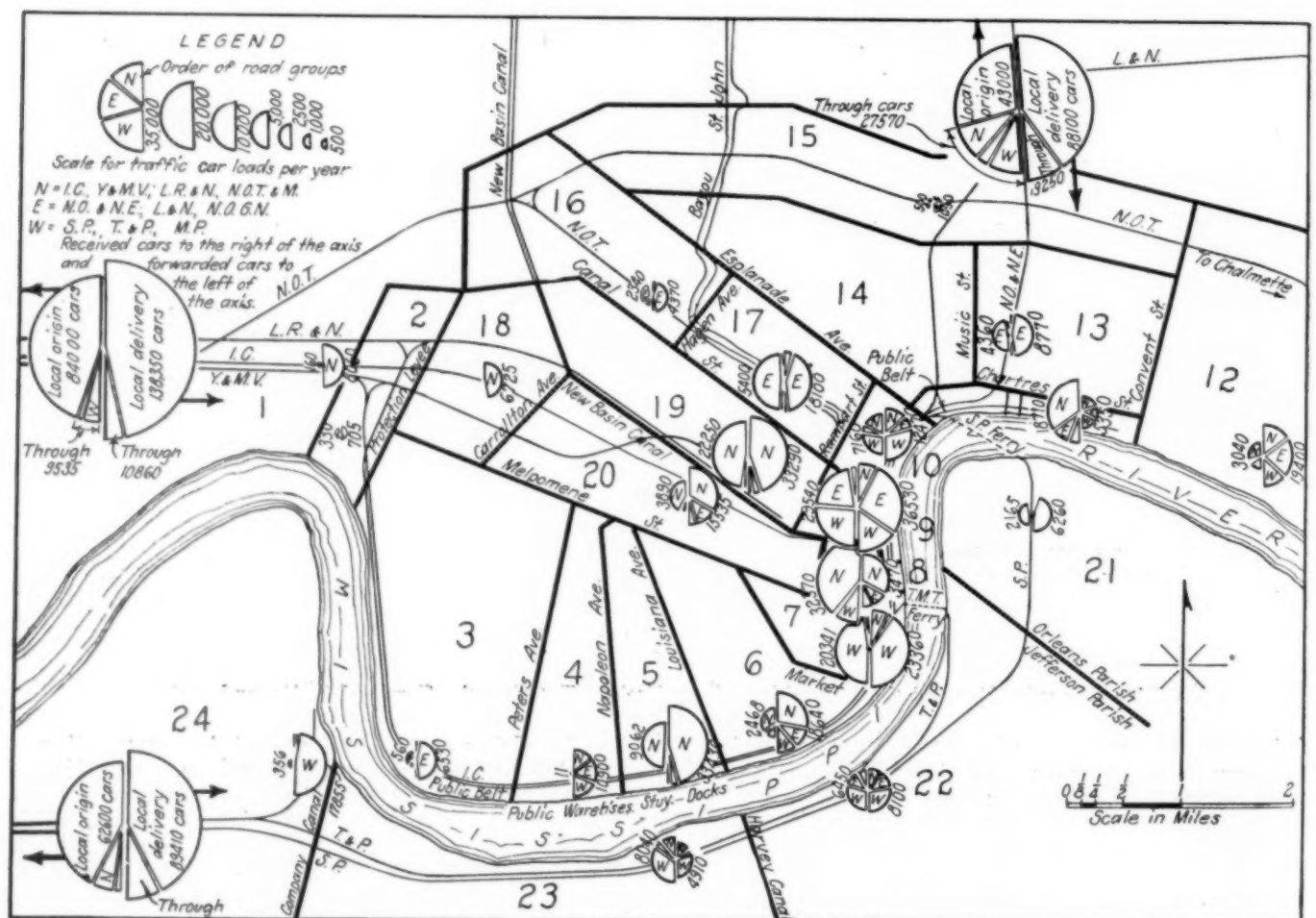
After studying the physical plant itself, the character and extent of existing facilities, the general scheme of operation, the rate of growth, the relative traffic density and the normal seasonal traffic variations from month to month, the actual survey of origin and destination throughout the ter-

sand local traffic sheets of all of the carriers and the listing of many hundreds of industries. To reduce the results to practicable limits, the district was divided into 24 delivery zones, incorporating, as far as possible, terminals of individual railroads. With this zoning it was possible to study group operation intelligently and plan additional facilities accordingly.

The total railroad freight movement for November amounted to about 80,000 cars received and forwarded or 870,000 per year. The Public Belt in 1915 handled 108,000 revenue cars and a total of 247,000 cars (not strictly comparable with the above). The "flow diagram" shows the actual distribution of 35,062 car loads received and 20,865 car loads forwarded, also 9,651 car loads of export and 4,807 car loads of import tonnage. The difference between this car load movement and the total cited above is, of course, empty movement.

Survey Showed Little Through Rail Traffic

One of the principal facts brought out was the relatively small percentage of through inter-change, all-rail move-



A Zone Map of New Orleans Showing the Origin and Destination of All Freight in 1915

terminal district proceeded. The month of November, 1915, was selected as the last record year of pre-war conditions which could be considered as reasonably normal, judged by similar totals for 1910, 1915 and 1917.

The actual survey produced a record of the movement of every car from entry to exit, traced down to house tracks, team tracks, docks and wharves, industrial spurs and ferries and also as between loads, empties, through, interchange, intra-terminal, belt railroad and passenger train movements. This survey required examination and tally of many thou-

sand points outside of New Orleans—only 13 per cent of the total inbound movement of 35,000 cars. On the other hand, a relatively high proportion of cars, 34 per cent, was handled by switching lines, which indicates the large amount of switching movement in a port-terminal district. This indicated that there is little necessity for a single central clearing yard for all lines, but a great need for maximum convenience in delivery and interchange. Further, the survey brought out in contrast the relatively small amount of team traffic as compared with the large freight

house traffic, which latter is accentuated by reason of the "in transit" business handled in various commodities—cotton, grain, sugar, molasses, tobacco, sisal, etc.

A comparative study of this chart with that of other cities, such as Chicago, clearly, indicates the special nature of the freight business in a port like New Orleans, requiring exceptional facilities for water-borne traffic to secure the utmost freedom of movement from the interior to ship's bottom with the least delay in handling.

Among other studies developed in the investigation was one showing the origin and destination of freight as indicated in the zone map. Here the relative volume of traffic entering or departing via the east, north and west side rail gateways may be traced to origin and destination within various traffic zones designated. Several important facts appear:

1. Over half of the New Orleans water front freight is concentrated in zones 7, 8 and 9, which is the district of greatest marine as well as rail activity. This movement is fairly well balanced inbound and outbound except for the preponderance of import fruit, largely bananas, in zone 8 and zone 13.
2. It indicates the importance of upland freight zones 17, 19 and 20, located on the land side of the city retail district (roughly running parallel to the river), thus relieving the water front to this extent.
3. It shows the preponderant traffic activity along the water front of the city proper, contrasted with that of south-side zones 21, 22 and 23, particularly zone 21, which is a part of the city of Algiers.
4. It shows about three-quarters of the western freight, excluding empties, crosses the river by ferries at zones 7 and 10.
5. It shows the relative volume of through interchange business, particularly as forwarded by the eastern group of roads.
6. The important effect of the public warehouses and the Stuyvesant docks (zones 4 and 5) is tending to encourage traffic to move up-stream into freer territory and nearer the all-rail crossing projected.

This same method of analysis was applied to each road, but indicating the distribution of tonnage as between wharves, railroad warehouses and team tracks, industries and private warehouses. In those detailed studies a further point of interest was noted e. g. the large amount of through interchange rail freight carried into the waterfront district instead of around the city. Thus, one road received or forwarded from 24 to 28 per cent of its traffic to or from connecting lines by city ferry.

Special mention should be made of the Texas & Pacific city freight terminal development because it was the first to build at right angles to instead of parallel with the waterfront, thereby largely avoiding the trucking congestion of the marine zone and giving easiest access to city trucking directly from the main street passing in front of the terminal. Likewise both the Illinois Central and the Southern city freight terminal operations are carried out largely on the upland side of the business and retail district, thus keeping this freight entirely out of the water front marine zone. On the other hand, one road was found operating as many as 64 terminal tracks from one switch lead wedged in between the various water front lines and another road operating 40 terminal tracks through its passenger station tracks.

Conclusions

1. Every city, seaboard or inland, should be at work upon its transportation plan of the present and the future as an integral part of its city plan.
2. The terminal organization seems to be the one feature upon which basic data, as a basis of re-planning, is generally unavailable. Analysis of terminal operations throws definite light upon design and operation as to such features as the economic location of yards and interchanges, the better handling of classification movements, the best location and type of local yards and facilities, the basis for economic study of back-haul and dead mileage, the redistribution of

terminal traffic within a congested zone, the maximum unification of rail and marine facilities and the general lines of best future development.

3. Railroading is a continuous function; shipping an intermittent one. The terminals provide the reservoir capacity to absorb the difference in turn-around time in ships and cars and warehousing is a most important part of this facility.

4. The clearing capacity of the gateways during heavy traffic seasons determines the efficiency of the port and the cost and time consumed in transit. What is needed is more movement, not more vehicles. It is the cost of idleness forced upon the carriers that eats up the profits.

5. Major traffic routes for interior production must find and rest upon their economic justification in order to become permanent. The gateways must develop to meet the demands of traffic growth.

6. Expressed in dollars, the demands of the future are portentous. The basic tonnage of the country and traffic requirements have increased for several decades nearly as the cube of the population. By 1940, our 130 million people will require the movement of nearly 4 billion tons of freight as compared with 2½ billions today, and at least 10 billion dollars of new capital (excluding replacements). Probably half of the present railroad investment of 21 billion is in other than main lines, i. e., terminals. But the total port development of the country (excluding railroad facilities) has cost only about 1 billion, the same as the inland waterways, including Panama.

7. Obviously the co-ordination of these vast expenditures, especially within the port terminal zones or gateways and the closer economic integration of rail and port is the major problem before the port authorities. The newer ports have been able to start with a clean sheet. The older ports must follow suit by efficient replanning and development.

Applying this analysis broadly, one is struck by the fact, often neglected, that railroading is a continuous function; shipping, an intermittent one. The difference in the turn-around time of ships and cars must be met by reservoir capacity. Who is going to provide that capacity? That is one of the problems of the port plan. Thus, it is the clearing capacity of the gateways during heavy traffic seasons—from moving train to moving ship—in which commerce is mostly concerned; likewise, the total terminal cost and the time consumed in transit, railroads, ports and warehousing are all involved. What is needed at present is more movement, not more main lines, cars, ships or ports. It is the cost of idleness that eats up the profits.

Commerce travels along the lines of least resistance, usually measured by time and (or) cost. Like water running down hill, there is already a clearly defined drainage basin for every port and an economic divide or mountain range defining the boundaries of that drainage basin, and eventually major traffic routes for interior production must find and rest upon their economic justification in order to become permanent. So the gateways must retain their efficiency in order to enjoy permanency and to meet growth. The gateways are the key to the situation.

THE ALASKA RAILROAD reports that the arrival of a shipment of structural steel lining plates and vault doors weighing 12,800 lb. at Fairbanks, Alaska, in 25 days from Hamilton, Ohio, the fastest time ever made in the transportation of freight from the United States to the interior of the Territory. Under former conditions this shipment would have had to be made during the summer months, because no transportation of heavy loads was possible during the winter to the interior of Alaska, and it also would have had to be routed to a seaport on the Alaskan Peninsula and carried for many miles up the Yukon River by steamboat to reach Fairbanks.

A Car Service Record

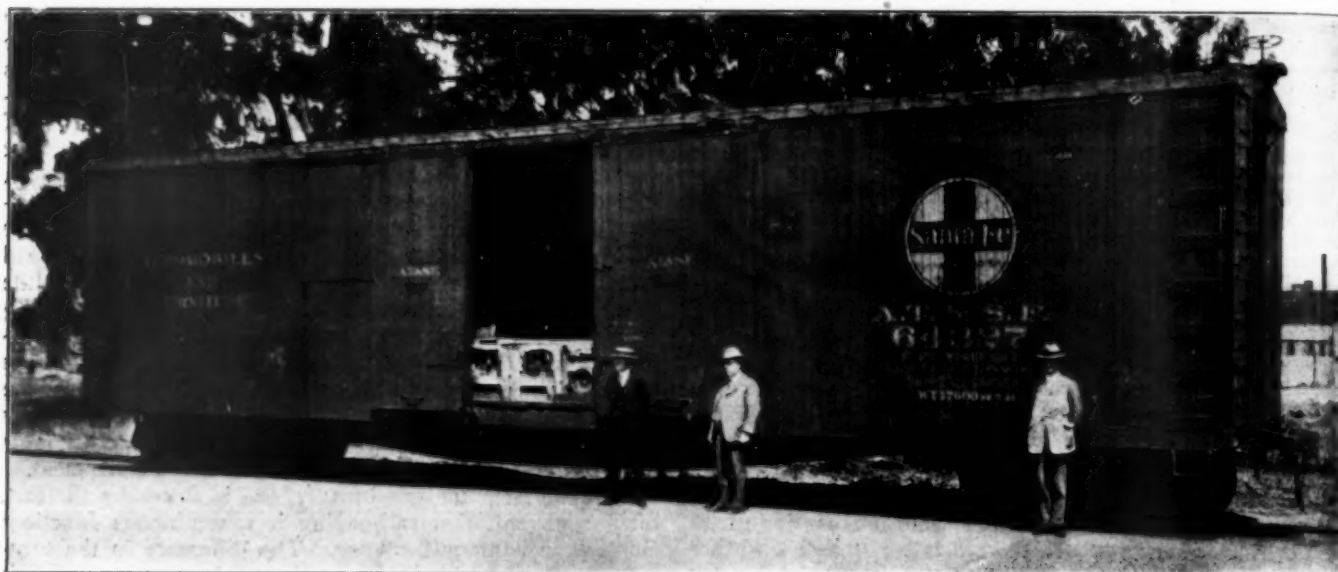
By C. B. Strohm

Supt. of Transportation, Atchison, Topeka & Santa Fe,
Chicago

ON NOVEMBER 23, 1922, Atchison, Topeka & Santa Fe 50-ft. automobile car No. 64327 was loaded at Cleveland, Ohio, with automobile frames for the Durant Motor Company at Oakland, Cal., routed via the Atchison, Topeka & Santa Fe from Chicago. The car was reloaded by the Oakland branch of Durant Motor Company with automobile motor crates to the Continental Motors Corporation, Muskegon, Mich., and was there reloaded with Continental motors for the Durant Motor Company at Oakland. The car has been kept in this continuous service carrying motors

Continental Motors Corporation; all of the movements (except the initial trip, Cleveland to Chicago) were made over the Pere Marquette and the Atchison, Topeka & Santa Fe. It is still in this continuous service and the employees along the Pere Marquette and the Atchison, Topeka & Santa Fe have become much interested in the record it is establishing, have dubbed it "Old Faithful," and are helping it along, hoping to keep it going for another year or longer.

PERSONS KILLED BY VEHICLES in the streets of New York in the month of January numbered 73, and the total injured was 2,062. The number killed in December was 100, both fatal and non-fatal injuries falling off in January about 27 per cent. Barron Collier, special deputy police commissioner, attributes this diminution in the death rate to the action of the police department in distributing safety pledges to the pupils in the public and parochial schools,



Santa Fe Automobile Box Car Which Has Made Unusual Record

in one direction and motor crates in the other, and on arrival at Muskegon November 23, 1923, had made 18 trips during the year. The loading and arrival dates are as follows:

Loaded at	Date	Arrived at	Date
Cleveland	11-23-22	Oakland	12-11-22
Oakland	12-18-22	Muskegon	1-5-23
Muskegon	1-17-23	Oakland	2-1-23
Oakland	2-8-23	Muskegon	2-25-23
Muskegon	3-5-23	Oakland	3-20-23
Oakland	3-25-23	Muskegon	4-8-23
Muskegon	4-12-23	Oakland	4-25-23
Oakland	5-2-23	Muskegon	5-15-23
Muskegon	5-16-23	Oakland	6-2-23
Oakland	6-7-23	Muskegon	6-20-23
Muskegon	6-22-23	Oakland	7-5-23
Oakland	7-8-23	Muskegon	7-22-23
Muskegon	7-27-23	Oakland	8-8-23
Oakland	8-16-23	Muskegon	8-29-23
Muskegon	9-5-23	Oakland	9-20-23
Oakland	9-25-23	Muskegon	10-12-23
Muskegon	10-17-23	Oakland	11-1-23
Oakland	11-6-23	Muskegon	11-23-23

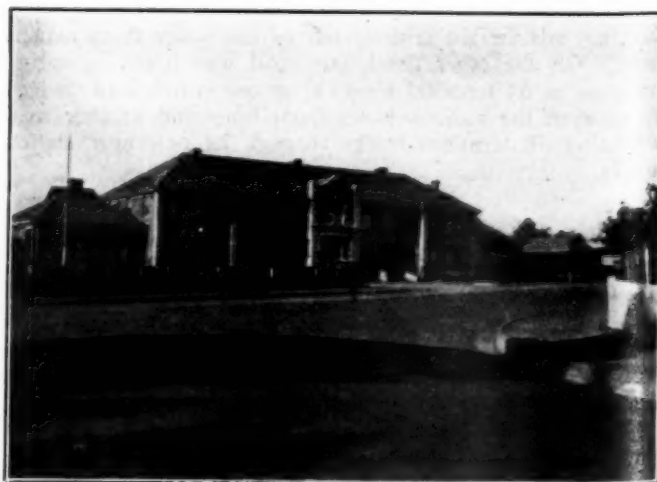
On these 18 trips the car traveled 48,969 miles. The weight carried was 627,454 lb., or an average of 34,859 lb. per trip; the average miles per day was 134, all loaded.

This car was built in 1912 and during 1923 it was in shops four times and received the following repairs:

- 3 pairs new wheels
- 1 brake hanger
- 1 grab iron bolt
- 1 air hose
- 1 air hose gasket
- 1 angle cock
- 1 Westinghouse K-2 triple, and cylinder cleaned, oiled and tested
- 1 10-in. packing leather
- 1 draft gear

The car has been kept in this continuous service through the co-operation of the Durant Motor Company and the

more than a million such pledges having been given out by the teachers early in January. The pledge calls for a signature both by the pupil and by one of his parents; and two-thirds of the pledges were properly returned. Weather and other conditions were substantially alike in the two months, December and January. Mr. Collier proposes to award a banner in each school district, to the school in which the largest percentage of signatures is returned.



Station at Ladysmith, South Africa

General News Department

Two men were killed when the boiler of the locomotive of a passenger train of the Santa Fe-Texas lines exploded near Lubbock, Texas, on February 13. E. R. Foster, roadmaster on the Stalon division, was killed an hour later when run over by a special train en route to the scene of the explosion.

The Interstate Commerce Commission's monthly report to the Senate on the condition of railroad equipment shows that during January, 102,676 freight cars were inspected by its Bureau of Safety of which 4.1 per cent were found defective and 1,766 passenger cars, of which 1.2 per cent were found defective. The Bureau of Locomotive Inspection during the month inspected 5,311 locomotives, of which 3,073 or 58 per cent were found defective and 737 were ordered out of service. There were 85 accidents during the month caused by the failure of some part or appendage of the locomotive or tender, in which 6 were killed and 93 were injured.

Revised A. R. A. Rules Adopted

Rule 16 of the A. R. A. per diem rules, as modified recently by a committee, lengthening the time of notice of embargoes, has been adopted by vote of the association, and goes into effect on March 1.

Car service rule 12, modifying the prohibition of placards on cars or locomotives, has also been adopted, to go into effect at the same time.

Purchases and Stores Meeting

The sessions of the June meeting of Division VI—Purchases and Stores, American Railway Association, which is to be held in Atlantic City, June 16-18, will be held in the Vernon Room of the Haddon Hall Hotel. The headquarters of the Division will be at the Chalfonte-Haddon Hall.

Supreme Court Denies to S. S. W.

Privilege of Examining I. C. C. Valuation Data

The United States Supreme Court in a decision rendered on February 18 affirmed the decision of a District Court denying to the St. Louis Southwestern an injunction to compel the Interstate Commerce Commission to allow it access to underlying data on its valuation. The court said that the road could have this opportunity before the valuation was actually used as evidence in later proceedings.

Pere Marquette Extends Scope of Group Insurance

The Pere Marquette is extending its group life insurance plan to cover all clerical employees in executive, general and divisional offices, all employees in station service, all warehousemen and truckers and all store department employees. Previous contracts with the Equitable Life Assurance Society included general officers, chief clerks and shop workers. Under the group plan, employees of one year and less than three years' service are eligible for insurance of \$1,000, those of three years' service and less than five years are eligible for \$1,500 and those of five years and over are entitled to take \$2,000. The amount of insurance permissible will be increased automatically until the maximum amount is reached.

Proposed Electrification of C. N. R. Line

Another experiment in electrification is soon to be made by the Canadian National Railways in Ontario. It is planned to discard the steam service on the 30 miles of the former Canadian Northern line between Cobourg and Orono, the latter about 45 miles east of Toronto. When the Canadian Northern was taken over and consolidated with the Government system the former running from Toronto eastward closely paralleled the Grand Trunk and the

Canadian Pacific and constituted a needless triplication of service. It is proposed to abandon entirely the 45 miles between Orono and Toronto and place electric cars on the 30 miles between that station and Cobourg. There will be a two-hour passenger service and the rich farming and fruit community will be given an adequate freight service.

Atlantic City Exhibit

A great number of applications for exhibit space at the Railway Supply Manufacturers' Association exhibit in Atlantic City during the meetings of the Mechanical Division, June 11-18, and the Purchases and Stores Division, June 16-18, have been received. It is the purpose to assign exhibit space on March 14. The number of applications filed up to this time is about 50 in excess of the number of applications filed at a corresponding date in 1922. Applications have been received from 245 exhibitors, representing 82,925 sq. ft., out of a total of 100,234 sq. ft. available. Applications for exhibit space or information about the exhibit may be obtained from John D. Conway, secretary-treasurer, Railway Supply Manufacturers' Association, 1841 Oliver building, Pittsburgh, Pa.

Roads to Protest Train Control Order

Following a conference in New York on February 15, a committee of six presidents was appointed to go before the Interstate Commerce Commission and show the unreasonableness of the recent order calling for the installation of automatic control apparatus on 94 railroads within two years. The committee consists of Samuel Rea, president of the Pennsylvania, and W. J. Harahan, president of the Chesapeake & Ohio, as representatives of the Eastern roads; Ralph Budd, president of the Great Northern, and L. W. Baldwin, president of the Missouri Pacific, as representatives of the Western roads, and W. L. Mapother, president of the Louisville & Nashville, and N. D. Maher, president of the Norfolk & Western, as the representatives of the Southern district. The committee has full power to prepare its own case. It will ask the Interstate Commerce Commission for a conference.

Help for Northwestern Banks

Western railways are taking an active part in the relief of the banking and agricultural situation in the northwestern states. The Great Northern has subscribed \$100,000. C. T. Jaffray, president of the Minneapolis, St. Paul & Sault Ste. Marie, has been made chairman of the board of directors and of the executive committee of the Financial Service Corporation, which was organized in Chicago on February 14 by bankers and commercial men. Ralph Budd, president of the Great Northern and Charles Donnelly, president of the Northern Pacific are also members of the executive committee.

Under the administration's plan for handling the Northwestern situation, the Financial Service Corporation will be eligible to borrow additional funds from the War Finance Corporation if the \$10,000,000 capital already raised should prove inadequate to meet immediate needs. A maximum of \$100,000,000 will be available for release since the Agricultural Finance Corporation is eligible to borrow from the War Finance Corporation in amounts up to ten times its capital. Actual work will be started as soon as the necessary service corporations can be formed to administer the funds. Two corporations will be formed, under the laws of Delaware. The Agricultural Securities Corporation will be a holding concern with a capitalization of 100,000 shares of no par stock and \$10,000,000 of five-year income debentures. The Agricultural Finance Corporation will have a capitalization of \$10,000,000, consisting of 100,000 shares of \$100 par stock. As the stock of the Agricultural Finance Corporation is issued it will be acquired by the Securities Corporation to secure funds for loaning purposes. Funds of the latter corporation will be obtained from the banking business and railroad interests pledged to support the plan.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1923

Name of road	Average mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Operating income	Net operating income	Net income 1922.
		Freight	Passenger	Total	Maintenance of way and structures	Traffic	Transportation					
Akron, Canton & Youngstown.....	170	\$201,160	\$834	\$201,994	\$19,593	\$11,044	\$65,333	61.20	\$84,334	\$69,760	\$36,385	\$23,152
Alabama & Vicksburg.....	170	2,564,613	10,772	2,575,385	2,695,136	105,237	802,459	61.60	1,034,736	864,001	\$307,083	\$23,152
Albany & Schenectady.....	141	1,600,499	84,549	1,685,048	72,682	10,800	325,272	66.80	1,034,736	864,001	\$307,083	\$23,152
Vicksburg, Shreveport & Pacific.....	141	2,449,231	708,933	3,158,164	621,442	110,829	1,134,037	66.80	1,034,736	864,001	\$307,083	\$23,152
Ann Arbor.....	188	222,738	128,730	351,468	377,044	11,345	133,073	76.90	801,573	467,730	556,373	286,392
Ann Arbor & Jackson.....	184	2,940,793	1,199,051	4,139,844	78,661	13,345	1,439,135	88.40	41,503	23,144	2,976	85,586
Atchafalaya.....	293	428,274	40,631	468,905	689,781	135,713	1,439,135	70.70	1,192,347	122,471	81,800	40,287
Atchafalaya & Santa Fe.....	293	4,859,746	484,066	5,343,812	73,814	9,227	2,504,755	81.10	1,059,575	805,892	460,554	426,862
Atchafalaya & Santa Fe.....	8,932	10,527,426	4,271,263	14,798,689	2,204,415	31,914	4,905,730	69.90	5,005,203	2,436,202	2,681,054	4,144,616
Gulf, Colorado & Santa Fe.....	1,908	139,655,477	46,445,181	186,100,658	27,684,155	3,569,660	62,309,672	71.70	57,674,519	38,545,894	40,815,194	35,509,010
Panhandle & Santa Fe.....	1,908	1,745,172	458,515	2,203,687	2,348,019	46,079	890,278	73.20	630,239	526,446	474,282	459,703
Panhandle & Santa Fe.....	858	632,192	189,170	821,362	80,507	544,396	8,369,942	77.90	5,688,876	4,646,243	3,963,151	4,192,458
Atlanta & W. Point (corrected report).....	858	6,863,994	1,552,140	8,416,134	1,374,486	7,899	222,258	61.10	337,764	335,574	298,641	159,915
Atlanta & W. Point (corrected report).....	93	1,231,571	85,909	1,317,480	55,010	10,399	109,126	78.50	1,910,879	1,636,727	1,258,046	236,615
West. Ry. of Ala. (corrected report).....	93	1,678,533	922,461	2,600,994	448,812	112,948	1,042,833	77.40	666,651	493,932	345,712	230,690
Atlanta, Birmingham & Atlantic.....	133	138,947	89,268	228,215	133,877	9,882	80,871	115.20	38,334	60,516	66,740	6,010
Atlantic Coast Line.....	639	3,053,396	3,042,221	6,095,617	499,970	583,253	935,024	93.50	723,327	546,378	505,889	492,853
Atlantic Coast Line.....	639	3,692,153	617,254	4,309,407	67,900	11,283	2,209,327	98.40	70,045	86,968	162,493	460,567
Charleston & Western Carolina.....	4,867	56,580,484	17,995,056	74,575,540	826,496	1,088,174	184,696	67.80	2,497,188	1,714,648	1,600,943	1,232,292
Baltimore & Ohio.....	5,212	13,142,075	2,669,121	15,811,196	917,113	143,603	2,662,707	74.00	2,103,882	15,466,425	15,496,609	14,416,370
Baltimore & Ohio Chicago Term.....	5,212	208,587,996	30,732,791	239,320,787	29,318,701	1,367,842	28,814,876	109.60	851,654	639,793	449,996	511,107
Staten Island Rapid Transit.....	23	77,386	95,336	172,722	3,029,609	327,996	7,139,741	90.20	1,675,632	846,625	603,695	5,138,556
Ranger & Aroostook.....	23	972,642	1,252,700	2,225,342	442,141	395,272	1,451,602	72.60	56,270,474	46,305,059	42,133,130	23,735,006
Belt Ry. of Chicago.....	616	437,715	83,196	520,911	554,036	65,305	339,067	72.60	90,447	49,959	113,948	24,463
Resemer & Lake Erie.....	32	.....	.....	.....	1,241,659	51,005	219,595	86.50	508,711	20,857	644,442	945,835
Bingham & Garfield.....	34	35,561	.....	35,561	53,909	61,529	265,278	104.50	8,696	24,581	39,253	24,567
Easton & Maine.....	34	437,449	.....	437,449	59,677	708,909	3,132,190	96.80	80,490	95,210	274,610	550,342
Brooklyn Eastern District Terminal.....	2,287	4,012,887	1,804,250	5,817,137	682,200	1,741,126	3,159,593	62.60	206,490	172,959	210,035	16,006
Buffalo & Susquehanna R. R.....	2,287	53,296,874	23,022,539	76,319,413	11,549,309	19,480,441	659,369	75.00	1,690,028	1,158,345	1,712,074	1,656,892
Buffalo, Rochester & Pittsburgh.....	9	100,258	.....	100,258	8,206	18,081	41,246	71.50	157,051	121,802	131,162	116,506
Canadian Pacific Lines in Maine.....	253	222,805	.....	222,805	85,288	189,561	67,592	63.80	2,603,594	2,127,457	1,872,208	1,652,490
Carolina, Clinchfield & Ohio.....	253	2,671,292	61,232	2,732,524	59,319	104,577	76,137	134.10	317,522	322,627	239,985	397,564
Central of Georgia.....	589	1,199,438	165,172	1,364,610	212,965	419,117	565,755	68.10	6,487,670	5,844,549	6,862,661	4,809,526
Central of Georgia.....	589	1,309,860	1,762,582	3,072,442	3,913,522	7,080,678	309,022	88.20	167,844	141,561	243,183	305,846
Central of Georgia.....	233	283,632	45,927	329,559	21,168	63,992	138,855	91.60	1,847,549	1,444,686	2,982,656	550,680
Central of Georgia.....	233	2,110,507	433,281	2,543,788	562,327	560,783	1,328,111	73.20	93,288	68,019	51,680	25,403
Central of Georgia.....	309	685,549	49,104	734,653	66,655	191,238	22,336	66.70	249,601	199,570	229,688	172,283
Central of Georgia.....	309	8,529,547	551,331	9,080,878	942,975	302,808	2,536,396	71.90	2,603,927	2,001,980	2,709,145	2,864,428
Central of Georgia.....	1,920	1,325,563	544,545	1,870,108	281,041	455,003	84,325	84.80	311,364	216,657	226,207	432,075
Central of N. J.....	1,920	18,040,385	5,675,132	23,715,517	3,416,925	5,605,848	996,153	80.70	5,050,051	3,830,354	3,928,973	4,392,085
Central Vermont.....	604	3,272,725	755,072	4,027,797	513,384	1,588,655	1,190,192	97.90	88,524	366,661	391,628	239,637
Chesapeake & Ohio.....	604	44,035,758	9,907,171	54,002,929	5,660,110	17,087,260	1,288,800	84.60	8,832,365	5,026,255	4,583,236	3,373,154
Chesapeake & Ohio.....	433	6,345,778	1,307,523	7,653,301	605,110	1,199,948	20,941	89.00	950,900	707,204	150,720	400,776
Chicago & Alton.....	2,552	6,774,636	1,034,739	7,809,375	815,501	1,451,158	196,468	77.70	1,826,412	1,153,451	1,338,630	1,387,818
Chicago & Alton.....	2,552	8,202,379	11,650,942	19,853,321	12,847,571	33,725,953	2,448,922	77.40	23,086,017	18,359,353	19,135,350	14,100,330
Chicago & Alton.....	1,050	24,027,397	6,858,010	30,885,407	4,558,103	8,102,878	708,794	95.50	8,196,965	6,914,832	5,914,832	5,914,832

EXPENSES OF RAILROADS

[illegible]

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating ratio.	Net from railway operation.	Net operating income.	Net op. income 1922.	
		Freight.	Passenger.	Total.	Maintenance of way and structures.	Traffic.	Trans- portation.					
Chicago & Erie.....	269	\$1,151,251	\$77,298	\$1,228,549	\$163,094	\$22,071	\$404,566	64.50	\$463,454	\$458,172	\$152,004	\$36,802
Dec.....	269	12,887,307	830,903	13,718,210	1,517,447	233,972	5,181,656	67.30	4,789,253	4,243,279	384,800	1,502,001
12 mos.....	269	12,887,307	830,903	13,718,210	1,517,447	233,972	5,181,656	67.30	4,789,253	4,243,279	384,800	1,502,001
N. Y., Susquehanna & Western.....	135	294,445	60,457	354,902	25,881	3,669	196,446	88.40	45,505	31,484	39,940	16,945
Dec.....	135	3,488,893	748,274	4,237,167	623,190	44,217	2,626,366	91.70	398,342	38,737	12,573	301,429
12 mos.....	135	3,488,893	748,274	4,237,167	623,190	44,217	2,626,366	91.70	398,342	38,737	12,573	301,429
Evansville, Ind. & Terre Haute.....	137	136,356	7,875	144,231	14,792	1,500	60,386	59.20	61,878	59,933	30,662	4,686
Dec.....	137	1,592,310	79,409	1,671,719	176,209	21,314	700,119	72.20	490,111	446,797	16,286	323,876
12 mos.....	137	1,592,310	79,409	1,671,719	176,209	21,314	700,119	72.20	490,111	446,797	16,286	323,876
Florida East Coast.....	764	909,104	436,197	1,345,301	243,651	21,479	519,123	68.00	516,990	332,652	273,856	345,494
Dec.....	764	9,409,907	4,595,452	14,005,359	2,570,184	170,815	4,881,988	67.20	5,522,668	3,896,030	3,165,911	2,699,262
12 mos.....	764	9,409,907	4,595,452	14,005,359	2,570,184	170,815	4,881,988	67.20	5,522,668	3,896,030	3,165,911	2,699,262
Port Smith & Western.....	249	99,154	30,841	129,995	39,963	5,112	50,741	85.50	20,192	12,168	—1,000	20,803
Dec.....	249	1,179,016	292,599	1,471,615	335,130	58,401	558,163	86.10	220,621	146,382	66,418	169,531
12 mos.....	249	1,179,016	292,599	1,471,615	335,130	58,401	558,163	86.10	220,621	146,382	66,418	169,531
Galveston Wharf Co.....	13	.....	.....	.....	147,909	964	45,148	73.10	39,778	3,287	3,363	12,073
Dec.....	13	.....	.....	.....	1,525,628	8,795	426,720	70.50	450,321	211,739	213,237	144,447
12 mos.....	13	.....	.....	.....	1,525,628	8,795	426,720	70.50	450,321	211,739	213,237	144,447
Georgia.....	328	337,670	132,391	470,061	5,800	20,388	242,035	66.10	171,644	159,187	158,539	128,767
Dec.....	328	4,490,706	1,310,331	5,801,037	649,363	250,801	2,565,507	77.50	1,310,540	1,193,095	1,193,095	811,838
12 mos.....	328	4,490,706	1,310,331	5,801,037	649,363	250,801	2,565,507	77.50	1,310,540	1,193,095	1,193,095	811,838
Georgia & Florida.....	405	116,156	27,256	143,412	18,974	8,463	56,511	73.40	40,589	33,985	23,490	17,372
Dec.....	405	1,423,639	252,793	1,676,432	224,614	100,802	709,100	76.00	428,738	352,031	236,746	99,106
12 mos.....	405	1,423,639	252,793	1,676,432	224,614	100,802	709,100	76.00	428,738	352,031	236,746	99,106
Grand Trunk Western.....	347	1,641,079	222,626	1,863,705	128,091	4,210	509,648	79.70	281,786	218,087	67,607	25,176
Dec.....	347	16,041,858	2,400,685	18,442,543	1,970,308	41,513	7,091,367	72.20	5,467,956	4,741,886	1,608,108	574,279
12 mos.....	347	16,041,858	2,400,685	18,442,543	1,970,308	41,513	7,091,367	72.20	5,467,956	4,741,886	1,608,108	574,279
Atlantic & St. Lawrence.....	166	319,655	21,536	341,191	47,489	14,061	168,616	91.40	30,374	15,149	—3,617	2,114
Dec.....	166	2,481,261	408,825	2,890,086	851,195	66,629	1,946,465	119.90	61,381	794,312	1,720,624	902,718
12 mos.....	166	2,481,261	408,825	2,890,086	851,195	66,629	1,946,465	119.90	61,381	794,312	1,720,624	902,718
Chic., Det. & Canada Gr. Tr. Jct.....	59	225,285	8,455	233,740	19,618	68	83,023	40.60	168,304	159,601	135,767	160,368
Dec.....	59	2,785,678	113,517	2,899,195	236,751	49,285	1,031,123	46.60	1,785,707	1,676,707	1,353,181	837,599
12 mos.....	59	2,785,678	113,517	2,899,195	236,751	49,285	1,031,123	46.60	1,785,707	1,676,707	1,353,181	837,599
Det., Grand Haven & Milwaukee.....	189	482,402	43,973	526,375	58,313	737	362,155	62.10	221,158	219,333	121,734	25,172
Dec.....	189	5,758,920	510,182	6,269,102	688,824	122,940	3,144,876	75.30	1,704,569	1,661,883	600,255	455,339
12 mos.....	189	5,758,920	510,182	6,269,102	688,824	122,940	3,144,876	75.30	1,704,569	1,661,883	600,255	455,339
Great Northern.....	8,251	6,197,295	1,254,919	7,452,214	1,551,605	147,671	3,126,711	71.50	2,398,984	1,596,024	1,661,586	1,465,287
Dec.....	8,251	93,672,147	15,305,242	108,977,389	21,725,041	1,821,771	45,146,275	72.20	33,327,249	24,193,040	24,731,992	17,726,598
12 mos.....	8,251	93,672,147	15,305,242	108,977,389	21,725,041	1,821,771	45,146,275	72.20	33,327,249	24,193,040	24,731,992	17,726,598
Green Bay & Western.....	234	94,140	10,480	104,620	11,169	3,050	40,849	84.80	6,320	1,630	—2,766	8,279
Dec.....	234	1,069,109	152,759	1,221,868	243,136	29,856	532,890	84.80	200,093	111,573	121,487	159,402
12 mos.....	234	1,069,109	152,759	1,221,868	243,136	29,856	532,890	84.80	200,093	111,573	121,487	159,402
Gulf Coast Lines.....	922	721,619	216,742	938,361	89,785	41,467	287,983	59.40	410,375	215,728	160,235	236,308
Dec.....	922	9,019,142	2,190,112	11,209,254	1,793,528	368,813	3,132,759	62.60	4,454,856	3,667,762	3,450,670	2,815,128
12 mos.....	922	9,019,142	2,190,112	11,209,254	1,793,528	368,813	3,132,759	62.60	4,454,856	3,667,762	3,450,670	2,815,128
Gulf & Ship Island.....	307	194,877	52,384	247,261	45,151	10,827	79,882	39.50	164,810	131,638	119,795	61,015
Dec.....	307	2,486,567	498,732	3,319,005	533,374	105,241	990,323	72.50	912,951	625,535	525,355	1,125,815
12 mos.....	307	2,486,567	498,732	3,319,005	533,374	105,241	990,323	72.50	912,951	625,535	525,355	1,125,815
Gulf, Mobile & Northern.....	465	394,152	56,797	450,949	79,392	20,632	175,731	83.50	77,882	75,361	62,135	99,063
Dec.....	465	5,192,874	515,544	5,708,418	1,020,982	212,989	4,459,951	75.00	1,484,598	1,157,797	955,308	844,752
12 mos.....	465	5,192,874	515,544	5,708,418	1,020,982	212,989	4,459,951	75.00	1,484,598	1,157,797	955,308	844,752
Hocking Valley.....	348	890,184	94,746	984,930	518,835	14,596	338,754	97.80	23,118	—57,628	8,363	236,180
Dec.....	348	15,156,748	1,113,924	17,563,402	1,734,736	159,443	5,219,254	79.90	3,536,213	2,460,830	2,454,068	2,243,067
12 mos.....	348	15,156,748	1,113,924	17,563,402	1,734,736	159,443	5,219,254	79.90	3,536,213	2,460,830	2,454,068	2,243,067
Illinois Central.....	4,845	8,928,362	2,663,649	11,592,011	1,960,890	252,519	4,637,774	77.90	2,769,007	1,889,976	2,036,206	2,918,348
Dec.....	4,845	127,081,546	37,042,401	164,123,947	24,406,198	2,408,275	38,343,302	80.00	33,197,751	23,500,783	22,906,244	25,121,128
12 mos.....	4,845	127,081,546	37,042,401	164,123,947	24,406,198	2,408,275	38,343,302	80.00	33,197,751	23,500,783	22,906,244	25,121,128
Yazoo & Mississippi Valley.....	1,380	1,233,823	503,059	1,736,882	273,023	26,052	690,154	71.20	556,221	414,892	405,061	546,011
Dec.....	1,380	15,640,112	4,328,434	21,366,546	4,606,795	286,328	7,945,008	83.20	3,542,140	2,163,280	1,957,196	1,631,609
12 mos.....	1,380	15,640,112	4,328,434	21,366,546	4,606,795	286,328	7,945,008	83.20	3,542,140	2,163,280	1,957,196	1,631,609
Illinois Central Combined.....	6,225	10,252,185	3,166,708	13,418,893	2,298,958	257,796	5,327,928	77.00	3,325,228	2,304,868	2,441,267	3,464,359
Dec.....	6,225	142,721,658	31,370,835	174,092,493	24,406,198	2,408,275	38,343,302	80.30	36,739,891	25,664,063	24,863,440	26,752,737
12 mos.....	6,225	142,721,658	31,370,835	174,092,493	24,406,198	2,408,275	38,343,302	80.30	36,739,891	25,2		

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net operating income.	Net op. income 1922.
		Freight.	Passenger.	(Inc. misc.)	Maintenance of way and structures.	Traffic.	Trans- portation.						
Lehigh & New England.....	210	\$410,094	\$1,856	\$419,172	\$61,863	\$5,934	\$145,389	\$330,383	78.80	\$88,789	\$69,493	\$84,553	\$143,841
Lehigh Valley.....	219	5,720,616	22,652	5,743,268	1,557,388	87,126	1,842,486	4,668,245	76.50	1,374,891	1,499,814	1,262,859	721,887
Los Angeles & Salt Lake.....	1,335	5,238,079	631,805	5,869,884	625,160	107,078	2,674,885	4,766,533	75.20	1,567,303	1,470,133	1,313,907	384,304
Louisiana & Arkansas.....	1,335	63,122,821	7,406,346	70,529,167	7,812,353	1,176,966	32,140,661	66,734,214	87.90	9,180,939	6,853,696	6,573,120	500,084
Louisiana Ry. & Nav. Co.....	1,209	1,424,070	577,405	2,001,475	324,979	66,461	710,306	1,583,501	71.30	337,942	441,282	380,178	20,129
Louisiana Ry. & Nav. Co. of Tex.....	1,190	16,074,555	6,335,028	22,409,583	3,818,556	629,978	7,874,742	18,528,849	75.90	5,976,492	4,490,469	6,387,371	1,425,309
Louisiana Ry. & Nav. Co. of Tex.....	302	2,270,504	422,114	2,692,618	326,238	8,215	93,577	2,509,043	67.30	1,067,714	84,453	71,827	43,809
Louisiana Ry. & Nav. Co. of Tex.....	302	3,270,504	422,114	3,692,618	670,519	57,593	1,139,413	2,556,546	67.30	1,239,754	934,190	850,188	695,547
Louisiana Ry. & Nav. Co. of Tex.....	343	242,830	40,710	283,540	63,281	10,676	126,423	238,838	87.50	37,102	9,892	16,374	10,965
Louisiana Ry. & Nav. Co. of Tex.....	343	3,310,159	376,159	3,686,318	775,597	125,018	1,537,804	3,268,464	84.00	623,603	396,306	129,678	88,642
Louisiana Ry. & Nav. Co. of Tex.....	206	86,060	22,366	108,426	18,377	4,060	57,922	101,562	84.20	19,113	14,720	1,911	Not avail.
Louisiana Ry. & Nav. Co. of Tex.....	206	816,657	145,994	962,651	168,712	28,541	450,924	611,744	79.60	207,655	171,262	40,534	Not avail.
Louisville & Nashville.....	5,042	8,073,579	2,367,977	10,441,556	2,559,201	242,197	4,063,075	8,793,051	78.20	2,449,786	1,276,098	1,331,369	1,370,119
Louisville, Henderson & St. Louis.....	5,039	101,680,240	26,001,967	127,682,207	18,285,584	2,715,811	50,987,533	109,865,090	80.60	26,510,583	19,946,272	20,673,143	17,637,714
Louisville, Henderson & St. Louis.....	199	191,665	68,688	260,353	104,844	7,719	111,514	288,614	107.30	19,661	18,499	63,486	67,409
Louisville, Henderson & St. Louis.....	199	2,478,939	767,603	3,246,542	774,756	79,848	1,106,720	2,546,677	73.50	918,067	764,764	589,999	526,519
Maine Central.....	1,201	1,109,648	376,987	1,486,635	300,978	15,199	714,827	1,330,353	81.90	294,097	195,189	224,981	589,569
Maine Central.....	1,201	14,727,811	4,824,770	19,552,581	3,320,873	17,734	9,501,677	17,843,124	84.20	3,349,141	2,162,465	1,983,142	2,842,643
Midland Valley.....	365	282,350	71,744	354,094	87,755	7,166	105,306	208,705	52.80	158,573	136,334	122,777	86,713
Midland Valley.....	365	3,556,781	766,746	4,323,527	584,459	66,169	1,365,517	3,034,240	67.40	1,465,908	1,274,682	1,136,677	1,100,049
Minneapolis & St. Louis.....	1,649	1,156,530	132,465	1,288,995	318,412	28,653	428,229	1,132,652	83.60	222,068	151,314	94,901	185,861
Minneapolis & St. Louis.....	12 mos.	14,023,698	1,641,911	15,665,609	3,116,413	314,080	7,325,680	12,489,797	86.50	2,236,170	1,442,797	825,341	883,800
Minneapolis, St. Paul & S. S. Marie.....	4,402	2,536,965	597,715	3,134,680	347,057	60,441	1,374,449	1,034,002	72.50	943,485	754,746	702,545	817,671
Mississippi Central.....	12 mos.	37,604,190	7,666,758	45,270,948	6,466,681	709,022	20,282,439	37,611,134	76.20	11,730,202	8,746,637	8,204,096	7,178,971
Mississippi Central.....	237	114,506	23,145	137,651	39,583	5,475	48,803	127,279	89.30	15,210	10,576	10,250	35,775
Missouri & North Arkansas.....	12 mos.	1,526,488	205,996	1,732,484	379,727	69,099	597,421	1,454,761	81.00	341,803	279,263	284,533	193,303
Missouri & North Arkansas.....	12 mos.	76,405	24,043	100,448	25,455	4,631	54,866	113,043	102.50	2,747	6,776	9,870	1,560
Missouri & North Arkansas.....	364	1,139,759	269,757	1,409,516	279,556	44,752	634,477	1,268,465	84.00	241,385	207,784	112,799	82,378
Missouri-Kansas-Texas.....	1,813	2,019,263	556,829	2,576,092	338,519	50,007	751,166	2,307,253	81.60	518,717	316,308	478,450	951,553
Missouri-Kansas-Texas.....	12 mos.	25,917,024	5,970,138	31,887,162	10,355,957	635,429	10,116,719	1,998,328	76.00	8,166,344	6,138,122	7,553,554	9,114,533
Missouri-Kansas-Texas of Texas.....	1,389	1,219,905	576,929	1,796,834	276,185	35,343	730,441	1,368,984	71.20	563,526	506,772	300,061	26,188
Missouri-Kansas-Texas of Texas.....	1,476	13,874,191	5,325,318	19,199,509	4,130,768	495,924	8,263,549	16,883,159	80.10	4,193,255	3,587,924	1,256,035	1,280,467
Missouri Pacific.....	7,364	7,008,824	1,742,871	8,751,695	1,699,069	173,177	3,912,811	8,030,116	83.90	1,545,267	1,177,558	866,398	1,523,314
Mobile & Ohio.....	7,235	85,961,414	18,970,394	104,931,808	16,464,816	2,019,996	34,885,243	97,939,666	85.50	16,667,982	12,185,417	8,893,245	8,247,035
Mobile & Ohio.....	1,165	1,215,568	217,837	1,433,405	289,982	47,757	557,196	1,226,530	79.70	311,380	240,224	167,340	266,910
Mobile & Ohio.....	12 mos.	16,937,781	2,043,608	18,981,389	2,812,790	553,662	7,360,709	15,620,680	78.70	4,273,357	3,289,496	2,695,009	2,713,282
Monongahela.....	106	362,788	33,901	396,689	67,318	1,054	140,394	326,282	81.20	75,492	60,132	10,493	102,068
Monongahela Connecting.....	106	5,439,037	435,783	5,874,820	755,571	13,121	1,275,015	3,962,782	66.50	1,997,359	1,867,123	895,758	717,193
Monongahela Connecting.....	12 mos.	106	5,439,037	435,783	755,571	13,121	1,275,015	3,962,782	66.50	1,997,359	1,867,123	895,758	717,193
Montour.....	57	97,285	857	98,142	20,948	971	33,732	129,436	130.90	30,576	44,155	11,445	36,341
Montour.....	57	2,333,840	5,943	2,339,783	404,452	12,991	482,469	1,675,934	70.80	692,268	542,327	871,051	277,022
Nashville, Chattanooga & St. Louis.....	1,258	1,306,764	465,016	1,771,780	395,382	80,577	772,435	1,460,029	90.30	188,099	146,081	158,756	482,853
Nashville, Chattanooga & St. Louis.....	1,258	18,027,477	5,060,565	23,088,042	5,919,108	883,475	9,466,281	22,227,211	86.50	3,348,740	2,642,169	3,061,971	3,094,209
Nevada Northern.....	165	75,814	10,637	86,451	12,562	871	17,979	56,474	60.60	36,424	29,502	29,067	6,305
Newburgh & South Shore.....	165	848,196	112,180	960,376	143,093	8,272	183,400	460,516	46.80	561,435	478,028	483,077	187,175
Newburgh & South Shore.....	165	.....	.....	192,614	37,433	.....	88,098	193,302	100.40	688	30,033	29,390	16,872
New Orleans-Great Northern.....	274	168,923	37,486	206,409	15,496	8,077	50,076	181,749	84.10	340,667	169,412	105,693	252,858
New Orleans-Great Northern.....	274	2,320,781	412,997	2,733,778	365,204	72,571	851,627	1,936,151	62.40	81,028	68,653	74,299	72,775
New York Central.....	6,899	19,557,195	8,405,968	27,963,163	4,660,199	339,197	12,138,157	10,133,336	89.00	3,526,114	2,555,240	2,514,844	6,443,274
New York Central.....	6,898	273,565,155	98,585,821	372,150,976	50,486,485	4,007,325	149,018,945	10,260,279	77.50	94,770,938	72,079,785	70,667,192	53,973,003
Cincinnati Northern.....	244	338,438	14,775	353,213	82,001	4,793	122,117	210,803	58.20	151,170	133,568	99,834	21,155
Cincinnati Northern.....	244	4,923,107	163,888	5,086,995	517,419	57,132	1,698,978	3,917,998	69.10	1,600,421	1,352,579	838,257	348,557
Cleveland, Cincinnati, Chic. & St. L.....	2,407	4,784,795	1,643,994	6,428,789	867,229	119,511	2,936,937	6,054,393	85.70	1,011,755	704,237	493,944	1,404,577
Cleveland, Cincinnati, Chic. & St. L.....	2,407	69,395,847	17,891,955	87,287,802	9,941,444	1,330,103	34,558,725	12,114,741	76.00	22,262,703	17,689,270	16,691,961	13,747,229
Indiana Harbor Belt.....	119	.....	.....	879,253	45,980	5,428	428,230	650,590	74.00	228,304	217,799	60,309	12,047
Michigan Central.....	1862	4,702,953	1,937,652	6,640,605	1,533,676	55,566	5,165,391	2,561,916	70.50	3,424,070	3,051,050	1,483,821	1,718,992
Michigan Central.....	1862	64,138,680	21,466,658	85,605,338	11,069,136	1,116,615	3,041,592	15,634,944	85.20	1,099,791	677,416	662,239	1,856,209
Pittsburgh & Lake Erie.....	234	2,694,008	280,666	2,974,674	363,343	19,566	899,227	2,695,527	88.30	358,807	188,040	473,928	1,054,937
Pittsburgh & Lake Erie.....	234	40,559,529	3,305,399	43,864,928	5,212,893	262,071	12,414,060	30,650,779	68.70	13,988,987	11,233,649	15,374,595	5,270,742
New York, Chicago & St. Louis.....	1,696	4,021,739	2,165	4,023,904	4,599,157	1,674,147	1,574,147	1,870,771	87.00	532,366	477,247	537,295	271,831
New York, Chicago & St. Louis.....	1,696	52,832,311	2,372,475	55,204,786	7,133,340	1,318,455	20,629,038	1,849,513	76.40	13,532,217	10,679,644	9,198,854	8,373,845
New York Connecting.....	19	154,936	.....	154,936	15,037	.....	44,446	87,495	37.40	135,977	94,887	60,925	93,106
New York Connecting.....	19	2,159,272	3,278,056	5,437,328	175,584	.....	578,663	1,758,663	30.80	2,268,218	1,819,537	1,477,939	1,155,176
New York, New Haven & Hartford.....	2,000	4,672,359	4,603,576	9,275,935	1,094,180	61,543	4,118,950	294,230	75.30	2,466,287	2,247,931	1,841,102	659,748
New York, New Haven & Hartford.....	2,000	67,186,374	51,360,209	118,546,583	16,376,645	711,224	53,037,109	3,403,443	80.50	26,124,492	21,195,588	13,277,728	12,074,160

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating ratio.	Net from railway operation.	Operating income (or loss).	Net operating income.	Net up-income 1922.
		Freight.	Passenger.	Total.	Way and structures.	Maintenance of equipment.	Trans- portation.					
Central New England.....	295	\$625,634	\$14,993	\$640,627	\$101,104	\$180,939	\$5,776	78.80	\$140,522	\$91,899	\$51,671	\$12,581
Central New England.....	12 mos.	7,501,690	195,695	7,697,385	1,344,053	1,600,716	57,101	78.80	1,571,492	1,063,396	508,096	71,880
New York, Ontario & Western.....	569	722,407	119,968	842,375	1,028,935	99,847	14,220	78.80	1,412,227	1,237,735	174,492	163,023
Norfolk & Western.....	569	8,798,948	3,014,899	11,813,847	1,967,841	3,194,463	187,431	87.20	1,779,017	1,368,425	410,592	334,216
Norfolk Southern.....	2,240	6,705,633	923,816	7,629,449	807,412	1,332,414	83,010	65.80	2,575,612	2,212,600	363,012	2,377,969
Norfolk Southern.....	12 mos.	81,320,794	10,131,497	91,452,291	12,406,593	25,137,890	991,805	76.10	22,870,888	16,610,445	6,260,443	18,624,468
Norfolk Southern.....	12 mos.	7,354,159	1,479,625	8,833,784	1,321,136	1,321,136	285,639	71.80	2,361,361	1,976,681	384,680	1,108,077
Northern Pacific.....	6,668	3,863,662	1,235,445	5,099,107	807,696	1,234,561	145,672	75.90	2,261,008	1,798,043	462,965	1,108,375
Northern Pacific.....	12 mos.	77,610,570	15,438,784	93,049,354	14,022,060	22,664,342	1,954,443	78.80	21,637,250	13,154,931	8,482,319	2,868,886
Northern Pacific.....	12 mos.	496	2,621,387	2,621,387	1,323,160	1,323,160	285,639	71.80	2,361,361	1,976,681	384,680	1,108,077
Pennsylvania R. R.....	10,484	36,506,961	13,112,127	49,619,088	5,024,437	13,569,420	208,775	78.20	11,924,302	9,803,954	2,110,348	1,563,167
Pennsylvania R. R.....	12 mos.	502,698,606	155,516,003	658,214,609	85,363,281	186,577,704	7,754,739	81.90	130,879,378	97,820,216	33,059,162	83,556,849
Baltimore, Chesapeake & Atlantic.....	87	55,710	36,336	92,046	19,472	33,595	1,474	141.30	40,173	40,173	0	45,483
Baltimore, Chesapeake & Atlantic.....	12 mos.	1,041,214	464,009	1,505,223	177,791	438,421	21,007	105.50	86,764	152,003	65,239	18,358
Long Island.....	397	836,408	1,512,683	2,349,091	364,750	479,404	22,527	82.30	456,019	351,286	104,733	19,153
Long Island.....	12 mos.	10,511,745	20,752,638	31,264,383	4,189,220	5,745,004	267,709	75.50	8,348,331	6,548,596	1,799,735	123,431
Maryland, Delaware & Virginia.....	52	8,565	7,382	15,947	18,687	5,863	473	197.10	18,145	18,145	0	8,973
Maryland, Delaware & Virginia.....	12 mos.	649,182	308,155	957,337	94,501	267,271	14,634	111.20	111,040	137,166	26,126	150,604
West Jersey & Seashore.....	359	340,360	431,935	772,295	140,213	282,782	23,478	81.20	9,699	10,087	31,695	49,715
West Jersey & Seashore.....	12 mos.	5,015,380	8,059,190	13,074,570	2,369,870	2,632,665	480,044	84.80	2,149,934	1,287,401	862,533	1,279,702
West Jersey & Seashore.....	12 mos.	22,951	2,719	25,670	12,036	12,036	747	67.90	31,047	98,854	67,807	50,965
Peoria & Pekin Union.....	19	287,088	31,700	318,788	304,350	184,031	7,941	77.70	1,350,771	1,067,747	283,024	482,939
Pere Marquette.....	2,262	2,731,236	439,391	3,170,627	494,744	735,035	42,982	77.30	793,969	610,519	183,450	294,438
Pere Marquette.....	12 mos.	36,345,428	5,341,020	41,686,448	5,949,599	9,841,415	598,623	75.90	11,094,640	9,232,215	1,862,425	6,081,196
Philadelphia & Reading.....	1,125	6,512,254	910,771	7,423,025	1,338,715	2,487,268	64,601	92.50	586,456	160,547	425,909	1,228,677
Philadelphia & Reading.....	12 mos.	1,125	8,059,191	9,184,382	10,632,860	10,948,371	931,294	73.10	28,212,536	24,028,567	4,183,969	14,328,714
Atlantic City.....	170	118,946	125,816	244,762	261,831	34,249	4,525	182.20	215,236	232,892	17,656	17,656
Atlantic City.....	12 mos.	1,510,029	4,850,619	6,360,648	1,048,362	493,655	71,727	88.40	560,812	322,701	238,111	182,676
Atlantic City.....	12 mos.	1,043,260	85,741	1,129,001	6,717	4,995	1,299	51.70	57,152	409,785	352,633	33,397
Port Reading.....	21	147,638	.....	147,638	33,371	5,092	229	59.50	474,902	409,785	65,117	482,939
Port Reading.....	12 mos.	2,037,035	.....	2,037,035	269,064	186,625	77,125	63.20	68,078	43,304	24,774	72,245
Pittsburgh & Shawmut.....	102	84,255	6,578	90,833	4,962	10,467	274	55.0	1,181,171	968,545	212,626	113,891
Pittsburgh & Shawmut.....	12 mos.	1,178,277	55,100	1,233,377	236,505	454,973	20,165	101.70	1,537	1,692	17,704	39,468
Pittsburgh & West Virginia.....	89	244,476	10,148	254,624	28,944	114,022	3,991	110.20	128,577	145,847	17,269	8,134
Pittsburgh & West Virginia.....	12 mos.	3,331,304	112,279	3,443,583	511,947	1,170,618	44,671	77.50	68,465	30,460	38,005	79,872
Pittsburgh, Shawmut & Northern.....	210	92,544	6,811	99,355	23,209	41,929	1,599	78.60	824,261	343,102	481,159	79,705
Pittsburgh, Shawmut & Northern.....	12 mos.	1,273,420	73,821	1,347,241	369,167	487,420	20,412	113.60	20,185	25,426	5,241	15,156
Quincy, Omaha & Kansas City.....	250	56,956	27,668	84,624	13,624	15,215	962	80.30	56,367	13,766	42,601	133,463
Quincy, Omaha & Kansas City.....	12 mos.	872,054	272,789	1,144,843	427,375	239,179	10,253	104.50	1,306,747	1,084,379	222,368	168,318
Richm'd, Fredericksburg & Potomac.....	117	401,110	410,781	811,891	106,194	172,322	10,088	67.50	337,299	282,805	54,494	269,990
Richm'd, Fredericksburg & Potomac.....	12 mos.	5,873,373	4,243,153	10,116,526	2,217,062	1,813,408	103,912	65.70	4,141,037	3,466,093	674,944	2,543,648
Rutland.....	413	233,767	127,373	361,140	86,133	115,337	10,705	76.60	37,012	31,617	5,395	74,521
Rutland.....	12 mos.	3,852,408	1,529,974	5,382,382	695,796	1,205,005	16,480	98.40	7,611	14,375	1,956	54,424
Rutland.....	12 mos.	4,451,335	1,806,075	6,257,410	851,756	1,272,970	155,673	84.10	1,067,187	785,913	281,274	530,432
St. Louis-San Francisco.....	4,751	59,468,121	19,997,847	79,465,968	11,470,383	17,709,030	2,348,981	70.50	23,086,796	18,933,320	4,153,476	15,190,000
St. Louis-San Francisco.....	12 mos.	105,324	38,645	143,969	18,518	20,761	5,851	76.00	37,012	31,617	5,395	74,521
St. Louis-San Francisco.....	12 mos.	1,100,272	34,476	1,134,748	156,287	334,531	41,151	92.90	110,326	62,187	48,139	23,479
St. Louis-San Francisco.....	12 mos.	143,248	18,464	161,712	16,642	29,722	4,401	61.70	63,299	60,717	2,582	48,616
St. Louis-San Francisco.....	12 mos.	1,487,285	177,040	1,664,325	335,089	283,369	50,237	81.00	327,894	301,367	26,527	8,504
St. Louis-Southwestern.....	968	1,338,549	205,916	1,544,465	163,105	328,435	43,558	65.30	565,833	477,925	87,908	725,420
St. Louis-Southwestern.....	12 mos.	17,838,664	2,013,975	19,852,639	2,479,154	3,911,963	528,730	62.00	7,913,422	6,584,259	1,329,163	5,668,588
St. Louis-Southwestern.....	12 mos.	514,492	155,737	670,229	184,922	257,555	30,827	110.60	77,470	109,161	31,691	215,465
St. Louis-Southwestern.....	12 mos.	6,757,407	1,376,942	8,134,349	1,772,743	2,886,363	389,934	104.00	35,315	692,820	657,505	1,279,763
San Antonio & Aransas Pass.....	739	407,406	114,245	521,651	80,089	129,674	22,964	80.50	109,141	87,214	21,927	26,148
San Antonio & Aransas Pass.....	12 mos.	5,080,904	960,994	6,041,898	6,455,495	1,125,183	134,351	88.50	1,033,897	837,903	195,994	23,479
San Antonio, Uvalde & Gulf.....	317	50,957	27,985	78,942	11,121	16,308	6,307	80.70	17,352	13,420	3,932	19,250
Seaboard Air Line.....	3,576	3,288,399	1,152,566	4,440,965	490,444	695,637	162,054	78.60	260,915	219,317	48,598	7,269
Seaboard Air Line.....	12 mos.	36,574,384	10,349,864	46,924,248	6,972,362	8,947,037	1,642,467	73.10	1,319,416	1,039,480	279,936	513,593
Southern.....	6,971	8,123,954	2,291,214	10,415,168	1,391,946	2,230,167	276,082	77.20	11,096,851	9,690,482	1,406,369	4,230,570
Southern.....	12 mos.	6,971	105,439,499	33,756,011	150,467,985	20,680,326	29,521,929	70.20	3,708,984	3,142,035	566,949	2,914,870
Alabama Great Southern.....	318	592,394	214,632	807,026	55,547	228,929	54,649	74.70	38,053,726	31,031,931	7,021,795	20,472,778
Alabama Great Southern.....	12 mos.	8,051,920	2,159,451	10,211,371	1,267,688	2,301,856	257,274	71.30	280,622	186,296	93,926	295,312
Cin., New Orleans & Tex. Pacific.....	338	1,267,136	482,180	1,749,316	416,642	535,305	289,347	71.40	3,36,841	2,490,090	878,751	1,483,909
Cin., New Orleans & Tex. Pacific.....	12 mos.	17,407,412	4,520,807	21,928,219	3,134,703	5,185,537	7,052,468	71.70	6,527,108	5,486,652	1,040,456	4,856,766

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating ratio.	Net from railway operation.		Operating income (or loss).	Net operating income.	Net income 1922.
		Freight.	Passenger.	Total.	Maintenance of way and structures.	Equip-ment.	Traffic.						
Georgia, Southern & Florida.....	Dec. 402	\$273,464	\$152,109	\$425,573	\$55,279	\$69,640	\$11,258	\$173,165	\$11,368	\$11,368	\$128,387	\$94,586	\$96,977
12 mos. 402		3,456,569	1,813,091	5,269,660	519,444	896,040	110,796	2,070,122	17,672	17,672	2,070,122	1,586,339	1,586,339
New Orleans & Northeastern.....	Dec. 207	386,763	1,022,937	1,409,700	57,763	122,588	14,490	1,917,479	15,602	15,602	1,917,479	70,443	124,176
12 mos. 207		5,121,103	1,054,950	6,176,053	956,662	1,431,920	143,242	2,513,817	187,590	187,590	2,513,817	874,101	1,216,260
Northern Alabama.....	Dec. 110	116,027	17,405	133,432	30,957	6,417	2,586	43,989	3,711	3,711	47,711	15,694	51,982
12 mos. 110		1,535,276	164,550	1,700,000	297,752	90,297	28,262	584,504	45,553	45,553	584,504	203,415	203,415
Southern Pacific.....	Dec. 7135	9,607,119	4,043,193	13,650,312	2,044,404	2,360,268	282,626	5,356,232	514,912	514,912	5,356,232	2,427,299	2,830,317
12 mos. 7135		136,295,854	46,877,091	183,172,945	26,948,758	33,280,199	3,313,997	67,774,029	5,607,142	5,607,142	67,774,029	24,279,196	28,309,196
Arizona Eastern.....	Dec. 382	242,848	31,549	274,397	117,085	51,835	3,279	38,670	21,003	21,003	40,673	22,081	40,186
12 mos. 382		3,157,294	349,762	3,507,056	591,794	279,084	38,114	917,251	229,811	229,811	1,006,980	907,374	725,989
Atlantic Steamship Lines.....	Dec. ...	985,435	50,927	1,036,362	1,044,874	216,855	25,070	814,932	36,208	36,208	1,000,754	34,984	167,643
12 mos. ...		12,504,277	733,132	13,237,409	2,011,445	2,481,731	263,220	8,721,099	341,444	341,444	12,008,639	1,734,839	1,390,336
Galveston, Harrisburg & San Antonio, Dec. 1,379		1,482,461	509,371	1,991,832	325,324	555,951	53,619	825,098	75,543	75,543	825,098	234,544	191,997
12 mos. 1,379		17,432,184	5,118,180	22,550,364	4,446,145	5,316,805	524,619	9,139,120	1,038,955	1,038,955	9,139,120	2,809,677	2,809,677
Houston & Texas Central.....	Dec. 923	866,938	350,240	1,217,178	193,821	182,809	23,487	442,216	41,902	41,902	400,314	301,866	301,866
12 mos. 923		10,416,412	3,358,812	13,775,224	2,813,449	2,775,363	302,666	5,031,405	114,302	114,302	5,145,707	2,588,771	2,022,081
Houston, East & West Texas.....	Dec. 191	203,410	53,201	256,611	112,217	47,345	4,249	133,393	6,678	6,678	130,015	39,079	110,842
12 mos. 191		2,472,901	657,491	3,130,392	781,572	649,394	45,621	1,229,393	103,834	103,834	1,125,559	111,350	141,949
Louisiana Western.....	Dec. 207	267,589	103,879	371,468	39,404	68,369	13,161	129,495	17,099	17,099	276,026	97,480	136,898
12 mos. 207		3,256,347	1,095,386	4,351,733	4,663,298	759,592	126,314	1,353,944	202,260	202,260	3,600,411	951,550	854,743
Morgan's L. & T. R. R. & S. Co. Dec. 400		663,482	163,968	827,450	70,560	208,766	19,779	348,510	31,522	31,522	684,114	140,558	87,128
12 mos. 400		6,625,264	1,861,051	8,486,315	914,416	2,072,868	203,068	3,557,169	373,141	373,141	7,925,685	1,541,155	1,302,23
Texas & New Orleans.....	Dec. 507	519,958	212,956	732,914	795,321	219,562	16,055	362,095	21,763	21,763	710,344	123,651	209,250
12 mos. 507		6,413,628	2,035,478	8,449,106	2,617,113	2,244,950	158,558	3,406,876	301,325	301,325	8,148,781	1,490,551	1,077,775
Spokane International.....	Dec. 165	53,075	25,060	78,135	8,999	7,036	3,041	30,153	5,961	5,961	27,347	13,476	21,265
12 mos. 165		870,650	228,079	1,098,729	1,165,814	200,201	38,842	426,925	70,524	70,524	1,028,205	137,967	137,967
Spokane, Portland & Seattle.....	Dec. 554	629,425	197,932	827,357	900,029	103,186	9,417	200,013	17,528	17,528	809,831	356,244	212,037
12 mos. 554		6,140,495	1,788,118	7,928,613	8,704,947	1,121,063	119,204	2,512,855	212,747	212,747	7,716,166	1,882,173	1,654,204
Tennessee Central.....	Dec. 287	147,188	46,473	193,661	20,306	30,596	6,637	94,949	10,145	10,145	163,514	32,193	40,034
12 mos. 287		2,336,960	546,518	2,883,478	3,055,803	509,287	75,651	1,180,380	117,464	117,464	2,404,258	366,926	299,250
Term. R. R. Assoc. of St. Louis.....	Dec. 37	.....	.....	.....	91,111	406,936	980	157,255	11,275	11,275	138,530	123,651	209,250
12 mos. 37		.....	.....	.....	5,121,940	1,135,009	501,531	11,936	1,755,309	1,755,309	1,568,168	73,771	2,147,707
East St. Louis Connecting.....	Dec. 1	.....	.....	.....	11,476	13,995	279	73,652	3,163	3,163	102,466	67,001	63,408
12 mos. 1		.....	.....	.....	2,391,142	160,315	3,304	794,107	31,523	31,523	1,090,928	1,322,539	889,580
St. Louis Merchants' Bridge Term. Dec. 9		.....	.....	.....	63,504	101,589	3,900	207,140	9,113	9,113	315,749	48,729	37,975
12 mos. 9		.....	.....	.....	4,885,640	640,737	353,953	10,937	2,312,057	2,312,057	3,404,518	1,117,297	1,027,843
St. Louis Transfer.....	Dec. 6	.....	.....	.....	64,641	8,820	161	44,626	1,470	1,470	62,943	1,410	4,304
12 mos. 6		.....	.....	.....	867,804	73,148	1,972	465,066	16,071	16,071	882,937	170,909	23,676
Texas & Pacific.....	Dec. 1,952	2,003,821	844,092	2,847,913	408,388	568,889	54,852	983,402	158,261	158,261	1,989,036	813,545	649,880
12 mos. 1,952		22,482,492	7,573,856	29,996,348	4,571,382	7,273,178	625,094	11,485,278	2,491,658	2,491,658	24,504,720	5,237,535	3,629,472
Toledo, Peoria & Western.....	Dec. 247	74,374	47,618	121,992	35,172	40,467	2,491	68,462	7,136	7,136	153,640	29,257	58,591
12 mos. 247		1,157,901	498,706	1,656,607	361,975	584,450	29,630	914,474	89,092	89,092	1,278,567	281,524	212,424
Trinity & Brazos Valley.....	Dec. 368	202,833	32,989	235,822	59,378	81,973	3,223	121,829	17,646	17,646	282,633	35,971	18,084
12 mos. 368		3,150,735	241,644	3,392,379	511,531	759,738	38,345	1,145,430	154,669	154,669	2,601,439	798,995	13,858
Utah & Delaware.....	Dec. 128	41,072	12,204	53,276	18,011	10	42,304	66,893	8,160	8,160	16,623	13,951	34,365
12 mos. 128		882,615	437,807	1,320,422	277,041	277,041	30,804	837,300	91,395	91,395	1,455,396	220,187	143,690
Union.....	Dec. 45	.....	.....	.....	12,675,448	96,816	174	47,006	2,387	2,387	114,964	81,372	40,806
12 mos. 45		.....	.....	.....	12,645,303	867,373	2,139	5,764,989	95,003	95,003	2,843,189	3,398,528	3,899,383
Union Pacific.....	Dec. 3,711	6,393,942	1,472,116	7,866,058	874,938	1,725,273	149,792	2,835,363	274,997	274,997	2,075,129	1,920,934	2,583,614
12 mos. 3,711		88,728,990	18,205,803	106,934,793	14,503,312	24,041,486	1,730,992	33,222,202	3,307,212	3,307,212	79,094,064	28,844,300	26,621,319
Oregon Short Line.....	Dec. 2,366	2,295,966	441,209	2,737,175	423,421	5,406	45,519	1,039,081	110,772	110,772	2,200,369	483,915	1,164,000
12 mos. 2,366		30,418,891	5,554,131	35,973,022	6,330,468	7,274,672	531,893	12,236,474	1,332,093	1,332,093	28,454,465	7,037,048	6,825,884
Oregon Wash. R. R. & Nav. Co., Dec. 2,231		1,646,834	492,789	2,139,623	450,704	332,965	68,332	914,018	126,390	126,390	1,973,000	296,739	128,837
12 mos. 2,231		21,955,958	5,687,992	27,643,950	5,164,349	58,894	752,005	12,080,412	1,438,682	1,438,682	25,847,702	2,378,982	1,094,393
St. Joseph & Grand Island.....	Dec. 258	222,559	24,453	247,012	58,894	39,469	2,987	108,964	10,862	10,862	222,470	18,544	1,004
12 mos. 258		2,787,482	297,643	3,085,125	624,206	624,206	30,735	1,366,188	144,047	144,047	2,792,781	346,048	70,029
Utah.....	Dec. 102	150,902	435	151,337	22,590	24,180	496	42,508	8,783	8,783	98,547	45,752	31,586
12 mos. 102		1,639,855	6,903	1,646,758	373,649	441,181	4,604	446,419	67,044	67,044	1,270,096	295,426	265,296
Virginian.....	Dec. 543	1,000,702	91,683	1,092,385	306,809	493,620	12,027	360,536	29,814	29,814	1,116,824	265,374	265,374
12 mos. 543		18,093,632	937,781	19,031,413	2,219,868	5,344,302	142,493	5,536,112	418,912	418,912	13,611,421	5,532,711	5,532,711
Wabash.....	Dec. 2,472	4,103,062	914,429	5,017,491	713,786	1,147,637	129,588	2,164,598	156,316	156,316	4,332,290	816,497	526,833
12 mos. 2,472		51,696,168	9,794,594	61,490,762	9,501,515	13,884,271	1,518,004	24,997,690	1,864,185	1,864,185	52,033,495	8,941,275	4,107,421
Western Maryland.....	Dec. 804	1,551,150	76,006	1,627,156	302,368	317,092	35,076	524,164	50,234	50,234	1,242,982	378,273	259,482
12 mos. 804		21,030,921	959,474	21,990,395	2,919,972	5,882,271	439,528	7,736,944	546,928	546,928	17,161,464	4,621,552	3,074,576
Western Pacific.....	Dec. 1,043	782,704	162,285	944,989	101,818	187,310	35,482	387,633	36,188	36,188	809,271	128,667	188,188
12 mos. 1,043		10,513,817	2,424,299	12,938,116	2,293,119	2,371,860	427,171	4,754,370	3,465,122	3,465,122	2,512,773	3,004,525	1,966,442
Whaling & Lake Erie.....	Dec. 511	1,199,753	69,847	1,269,600	135,313	374,129	26,375	475,418	54,414	54,414	1,065,171	196,679	62,121
12 mos. 511		16,973,748	755,469	17,729,217	2,290,741	5,540,795	227,555	6,202,759	462,005	462,005	14,753,041	2,709,241	393,880

Fuel Association Convention

A Committee on Local Arrangements has been appointed to prepare for the International Railway Fuel Association convention to be held at Chicago, May 26 to 29, inclusive. At its initial meeting, the Hotel Sherman was selected as the headquarters for the convention and tentative plans were made for an exhibit of coal, coke, oil and railway supplies at the hotel during the convention week. The members of the Local Committee are W. H. Harris, president of W. H. Harris & Co., coal and coke dealers, chairman; Percival Hunter, Chicago, Burlington & Quincy; L. J. Joffray, Illinois Central; C. H. Dyson, Baltimore & Ohio; T. Duff Smith, Canadian National; Clarence Mellor, Barco Manufacturing Company; A. W. Clokey, American Arch Company; G. D. Cowin, Bell & Zoller Coal Company; Clark T. Roberts, Hedstrom-Schenck Coal Company, and D. B. Sebastian, formerly president of the Sebastian Coal Company.

Pere Marquette to Build 300 Refrigerator Cars

The Pere Marquette recently completed at its Wyoming (Grand Rapids, Mich.) shops the first of a series of 300 refrigerator cars, which are to be built by its own shop forces. One-half of the cars will be turned out at the Wyoming shops and the other half at the Saginaw, Mich., shops, with a total output for both shops that is expected to reach 20 a week, when production is well under way. The new cars are 40 ft. 10 in. long over end sills; 35 ft. 2 3/4 in. long between bulkheads; 8 ft. 2-3/4 in. wide between linings. They will weigh 46,000 lb. The basket type ice bunkers have a capacity of 9,600 lb. The cars are of steel underframe construction with wood superstructures and will be fitted with Hutchins all steel roofs, Murray friction draft gears with Farlow attachments and Bettendorf trucks. The walls will be insulated with 1/2-in. Insulite wall board and Johns-Manville hair felt, and the floors with two inches of cork board. These cars in a general way are of the Fruit Growers' Express type of construction. They will cost approximately \$1,000,000.

Program for A. R. E. A. Convention

The following is the program and order of presentation of reports of committees at the American Railway Engineering Association's annual convention which will be held at the Congress Hotel, Chicago, on March 11-13, inclusive.

FIRST DAY, TUESDAY, MARCH 11

President's Address.
Report of Secretary and Treasurer.
Reports of Standing and Special Committees on
Ballast,
Ties,
Buildings,
Wooden Bridges and Trestles,
Signals and Interlocking,
Water Service,
Economics of Railway Location,
Uniform General Contract Forms,
Standardization.

SECOND DAY, WEDNESDAY, MARCH 12

Reports of Standing and Special Committees on
Iron and Steel Structures,
Electricity,
Roadway,
Stresses in Railroad Track,
Shops and Locomotive Terminals,
Rail,
Track,
Yards and Terminals,
Economics of Railway Operation.
Annual dinner at 6:30 p. m.

THIRD DAY, THURSDAY, MARCH 13

Reports of Standing and Special Committees on
Rules and Organization,
Signs, Fences and Crossings,
Masonry,
Records and Accounts,
Economics of Railway Labor,
Wood Preservation,
Co-operative Relations with Universities.
New Business, Election and Installation of Officers.
Adjournment.

P. R. R. Women's Aid

The Women's Aid of the Pennsylvania Railroad System reports having completed its third year, its year of greatest activity and usefulness.

During 1923 this group of women workers, consisting chiefly of wives, daughters, mothers and sisters of Pennsylvania Railroad employees, visited 15,161 railroad families, giving assistance, where required, in the form of money, medical attention, food, clothing, fuel, etc., and carrying flowers, fruits and other delicacies to the

sick or injured. In carrying on this work, there was expended \$81,157, all raised by dues and voluntary contributions of the members, the holding of bazaars, sales of candy, etc. The total membership of the Aid rose to 117,023 at the close of the year.

This "Aid" was originally organized in 1917, to care for the home interests of employees of the railroad serving in the armed forces of the nation during the World War. It was reorganized in 1920, under its present name. The work was greatly extended last year, under the supervision of Mrs. W. W. Atterbury, director. In the Eastern Region the membership was brought up to 92,484, or practically one member for every employee. In the Northwestern Region the membership rose to 10,171. In the Central Region the organization has thus far been extended to three divisions. The work on the Southwestern Region was just commenced in the latter part of 1923. The membership at the Altoona Works rose during 1923 to 4,319.

The officers are wives of officers of the railroad. The activities of the organization which are carried on continuously throughout the year, embrace almost every form of assistance which may be needed by families of employees. An employee believed to be at the point of death was enabled to take the insulin treatment at the hands of a specialist. A mortgage and taxes were paid off on the home of a crossing watchwoman, widow of a deceased employee, with eight children to support. Board was paid for a tubercular employee at a health resort. Tuition was paid in business school for daughter of deceased employee. Financial aid was extended to the tubercular daughter of deceased employee. Board was paid at health resort for wife of clerk suffering from tuberculosis. Artificial limb was provided for child of employee.

Controversy Over Northern Pacific Land Grant

At the request of the Secretary of the Interior and the Secretary of Agriculture a resolution has been introduced in both the House and the Senate by Representative Sinott and Senator Lenroot providing for an investigation as to the right of the Northern Pacific to acquire some 3,000,000 acres of land in Idaho, Montana and Washington under the terms of old land grants. In addition to a statement made public last week the Forest Service has given out another statement on the subject in which it is contended:

"That the land grants were made for the purpose of aiding in the construction of the railroad. The total gross receipts of the Northern Pacific to June 30, 1917, from the sale of the lands from its grant amounted to \$136,118,533. The cost of constructing the railroad did not exceed \$70,000,000. The sale of lands has more than paid for the cost of constructing the railroad.

"That the Northern Pacific failed to construct 1,505.21 miles of its railroad within the time required by law, thereby rendering the granted lands subject to forfeiture.

"That the Northern Pacific has failed to dispose of certain of its lands to settlers at not to exceed \$2.50 per acre, as required by law.

"That the Northern Pacific failed to dispose of hundreds of thousands of acres of its lands at public sale, as required by law.

"That hundreds of thousands of acres of poor land in the Northern Pacific grant were erroneously classified as mineral and turned back to the United States, the railroad acquiring mineral indemnity rights therefor which were applied in part on more valuable lands in the indemnity limits.

"That under a rule of law laid down by the Supreme Court, the Northern Pacific has been erroneously allowed 1,500,000 acres too much land in the State of Washington.

"That over 500,000 acres of land credited to the Northern Pacific should be deducted because of conflict with the land grant of another road and the erroneous fixation of the land grant limit lines.

"That the Northern Pacific has been allowed to make over 1,300,000 acres of indemnity selections in its second indemnity belt, whereas these selections should have been confined to the first indemnity belt.

"That for lands erroneously patented to the Northern Pacific the government should be entitled to receive at least what the railroad received from the sale of these lands instead of \$1.25 an acre.

"That the Northern Pacific under the Mount Rainier park act of March 2, 1899, relinquished to the United States thousands of acres of commercially valueless land and received therefor selection privileges of the finest lands they could find in the States of Oregon, Washington, Idaho, Montana, North Dakota, Minnesota and Wisconsin."

Traffic News

The Southern Pacific Company plans to ask authority from the Interstate Commerce Commission to make further reductions in rates on freight from New York to the Pacific Coast by steamship to Gulf of Mexico ports.

The Traffic Club of the Cincinnati Chamber of Commerce has chosen for chairman for the ensuing year, R. E. Smith; vice-chairman, R. H. Morris; secretary, C. G. Frederick. The manager of the traffic department of the Chamber is F. M. Renshaw.

The Mississippi-Warrior Service will double its service between St. Louis, Mo., and Memphis, Tenn., on April 1, by the addition of a second barge. Under the new plan one of the barges will leave St. Louis each Tuesday and arrive at Memphis on Thursday. The second boat will leave St. Louis each Friday and arrive at Memphis on Sunday.

The legislature of South Carolina last week passed a law forbidding the collection of the surcharge on fares of passengers riding in sleeping and parlor cars. The Southern Railway at once began proceedings in the federal court for an injunction against the enforcement of the law. A hearing was to be held on February 19.

The Central of New Jersey and the Delaware & Hudson have filed petitions with the Interstate Commerce Commission, complaining of the smallness of their share of the rate on through freight to and from New England since the commission gave an increased share to the New England roads. Certain other roads are understood to be planning similar applications.

The increased rates on sixty-trip and fifty-trip commutation tickets on the New York, New Haven & Hartford in Rhode Island, Massachusetts and Connecticut, which have been the subject of repeated postponements, finally went into effect on February 18; and at the same time similar advances went into effect in the rates on interstate commutation passenger fares between points in these three states.

Commuters riding to and from Boston, who are aggrieved at the recent advances in rates on certain season tickets, and also at the slowness of the state authorities in acting on their numerous and varied complaints, have now gone to the Legislature asking that sixty-ride tickets shall be good for 35 days instead of 30 days; at the same time others are asking that the time limit be made 40 days.

The Traffic Club of Chicago passed a resolution on February 14, recommending that appointments to the Interstate Commerce Commission should be made solely on the basis of the experience and fitness of the appointees to serve on that body and condemning the growing tendency to make freight rates by political expediency. The resolutions were identical with those adopted recently by the Associated Traffic Clubs of America.

The Transportation Club of Louisville, Ky., at a meeting on February 12, elected A. M. Stephens, traffic manager of the Standard Oil Company, president; F. L. Speiden, agent of the Louisville Freight Traffic Bureau, vice-president, and W. G. Vandenburg, commercial agent of the Seaboard Air Line, secretary-treasurer. Directors elected were S. A. Cash, traffic manager of B. F. Avery & Sons; Arthur S. Key, traffic manager of the Federal Chemical Company; H. G. Dempf, agent of the Louisville & Nashville; George A. Perry, commercial agent of the Southern, and J. D. Marney, assistant general freight agent of the Baltimore & Ohio.

The San Antonio & Aransas Pass is going to have a citrus fruit experiment farm of 40 acres at Rockport, in Aransas county, Texas, under the direction of H. M. Madison, farm and immigration agent of the road, to promote the growing along its lines of citrus fruits of all kinds now grown successfully in California and Florida. Satsuma, Parson, Brown,

Pine Apple, and Surprise oranges will be planted in addition to three varieties of grape fruit as well as tropical fruits, Papayas and advocados and mangoes. This experiment farm will not only try new varieties of citrus and tropical fruits as discovered by the United States Department of Agriculture in foreign countries, but will also provide stock for growers on the San Antonio & Aransas Pass.

General opinion seems to be that the movement of fertilizer in the South in 1924 will exceed that of last year, according to a statement authorized by the Car Service Division of the American Railway Association. Reports indicate, however, that the loading of fertilizer in that territory intended for delivery in January and February has failed to meet expectations. This delayed movement, whatever its cause, will put an unusually heavy burden on the railroads in March and April. There are plenty of cars in the South now available for the loading of fertilizer, providing it is moved early in the season. To delay this movement until March or April may cause a very severe car shortage at that time. The Car Service Division has asked Southern carriers to do every thing possible to induce receivers to order fertilizer shipped without further delay in order to avoid crowding shipments into a short space of time with consequent car shortage and congestion at the plants.

The New York, New Haven & Hartford has filed with the Public Service Commission of New York a tariff proposing to increase monthly commutation ticket rates between New York City and suburban points within New York State. The company at the same time announces that it is actively engaged in perfecting plans for meeting the demands of the increasing volume of this traffic, one of which plans is for increasing the seating capacity of the cars used in suburban service, thus providing more capacity in the same number of trains and cars, sample cars with modified seating have been designed. The road is also giving consideration to the development of alternate service at differential rates by the New York, Westchester & Boston over the Harlem River Branch. The recommendations of the Westchester County Transit Commission are being carefully considered. The New York commuter has since August, 1920, paid substantially lower rates for commutation travel than have been and are now being paid for similar travel in the States of Massachusetts, Rhode Island and Connecticut.

Senate Committee Hearing On Fourth Section Bill

The Senate Committee on Interstate Commerce began its first hearing on February 18 on the bill introduced by Senator Gooding of Idaho to amend the fourth section of the interstate commerce act. Commissioner J. B. Campbell of the Interstate Commerce Commission was the first witness, explaining that he was appearing at the request of the committee and not as a representative of the commission, to express his own individual views, which have been at variance on this point with those of a majority of the commission. The committee expected to devote a week to the hearing, receiving testimony for three days from representatives of the proponents of the bill, for three days from representatives of the railroads and one day of rebuttal testimony.

Mr. Campbell said that much could be said in favor of an absolute prohibition of a higher charge for a shorter than for a longer haul but that the Gooding bill, which allows relief to the carriers in case of a circuitous route or in special cases after a public hearing, would be a material improvement over the present law. The present law, he said, causes a waste of transportation service, the worst kind of discrimination in favor of large centers and shippers against small communities and shippers, and is hindering the development of the intermountain country. Congress, in passing the law, he said, intended that relief should be granted by the commission only in special cases, and in his opinion the commission fell into a grievous error in allowing the carriers to file general applications covering thousands of rates under which thousands of violations have been continued without restraint for fourteen years. The carriers had asked relief until the cases could be heard and the commission had so interpreted the law as to permit fourth section violations without a public hearing but after a prima facie showing by the carriers or such investigation as it could make with evidence in its own office as to whether the proposed rates are reasonably compensatory. As a result the amendment of 1920 had had no practical effect.

Commission and Court News

Personnel of Commissions

A. D. Campbell, a member of the Railroad Commission of Florida, died at Dothan, Ala., on February 10.

C. L. Stryker has been appointed treasurer of the United States Railroad Administration, with office at Washington, D. C., vice Ralph Blaisdell, treasurer, resigned.

State Commissions

The Wisconsin Supreme Court, in a case brought by the Minneapolis, St. Paul & Sault Ste. Marie, against the Railroad Commission of Wisconsin, has ruled that the Commission is without authority to assess fees against interstate corporations for the issuance of bonds. The court upheld the validity of the Transportation Act regarding fees for such bond issues.

Court News

Assistant Roadmaster Held

Representative of Company

The Colorado Supreme Court holds that the negligence (if any) of an assistant roadmaster in directing a section foreman under his orders to board a moving train and throw off coal for the supply of the section crew, resulting in his injury, was chargeable to the company.—*Grove v. Freeman* (Colo.) 215 Pac. 873.

Right of Way But Not Cars

May Be Assessed for Highway

The Kansas Supreme Court holds that under chapter 246 of the Kansas laws of 1919 as amended by chapter 218 of the laws of 1921, the right of way of a railroad company may be assessed as other "real property and the improvements thereon" for its proportionate share of the cost of constructing a hard-surfaced road, although the right of way is but an easement; but the statute does not authorize the levying of an assessment on personal property for such purpose, and the levying of an assessment on the rolling stock and other personal assets of a railroad company therefor will be enjoined.—*Schaff v. Roberts* (Kan.) 215 Pac. 447.

Passenger Must Present Doctor's

Certificate in Reasonable Time

The Texas Court of Civil Appeals holds that a rule requiring one unable because of illness to travel in passenger cars and wishing to travel in a baggage car to have a doctor's certificate that he has no contagious or infectious disease, and that such travel will not endanger his life, is reasonable, and a statutory requirement that a passenger present himself for passage "within a reasonable time previous" to the scheduled starting time would not be complied with by presenting himself without the certificate, though that could be got promptly, if it would necessitate holding the train after starting time.—*Davis v. Kirklen* (Tex. Civ. App.) 253 S. W. 330.

Railroad Liable for Cattle Eating Poisoned Grass

The Arkansas Supreme Court holds that where a railroad sprayed weeds on its right of way with a poison chemical, knowing that cattle grazed there, without warning the owners of its intention to spray the grass or trying to prevent the cattle from grazing there, the railroad was liable for the death of cattle eating the grass, as a consequence of the spraying which it should have foreseen, though the cattle were trespassing. McCulloch, C. J., dissented, on the ground that the decision is an unwarranted extension of the doctrine of the turntable cases, that the railroad had a right to use its premises in that way, and was not bound to protect against trespassing animals.—*St. Louis-S. F. v. Fletcher* (Ariz.) 253 S. W. 12.

Labor News

The Canadian National Railways and the Canadian Brotherhood of Railway Employees plan to resume on March 1 at Montreal their negotiations over applications for increases in pay which were presented some time ago.

The Delaware, Lackawanna & Western has granted an increase in wages of 2½ cents an hour to its telegraphers and other employees included in the telegraphers' agreement. The increase will aggregate approximately \$32,000 annually.

Canadian Trainmen Seek N. Y. C. Scale

An increase of 6 per cent in their wages has been asked by the conductors, trainmen, baggagemen and yardmen of the Canadian National and Canadian Pacific as a result of the action of the New York Central in accepting the basis for negotiations struck by the brotherhood executives in the United States. Owing to the fact that both of the principal Canadian lines are pledged to adopt the scale of wages in existence on the lines of similar standard in the United States, representatives of the Canadian lines will almost immediately meet officials of the Canadian brotherhoods to discuss the new wage scale with that adopted by the New York Central as the basis. The new rates of pay are an advance of 30 cents a day to passenger train employees, 36 cents a day to freight train employees and 32 cents a day to yardmen.

Pensions Planned on C. N. R.

A conference was held at Ottawa on Tuesday for the purpose of drawing up a superannuation pensions scheme to apply to the whole Canadian National System and based largely on that now in force on the former Grand Trunk and on the former Intercolonial, both of which roads are now incorporated. The principal conferees were: Graham A. Bell, Deputy Minister of Railways and Canals; W. D. Robb, vice-president of the Canadian National; Tom Moore, president of the Dominion Trades and Labor Congress and a director of the Canadian National, representing the employees; and F. D. Finlayson, superintendent of the insurance branch of the Department of Finance.

In the case of the Intercolonial plan the contributors to the superannuation fund were the employees and the Canadian government, which has always controlled that road. How much money from the Federal treasury or from that of the Canadian National Railways, which is virtually the same thing, is involved in the new plan will not be disclosed until the terms of the act, based on the plan drafted on Tuesday and which will be later submitted to Parliament for approval, are made public.

Labor Board Decisions

Effect of Decision No. 2 on Contract Rule

In a dispute between the Mobile & Ohio and the four train service brotherhoods, the Labor Board has decided that Decision No. 2 did not supersede or annul the contract rules in effect on that date but only changed rates of pay.—*Decision No. 2091*.

Discontinuance of Bonus Hours

The Labor Board has ordered that Decision No. 222 and its addenda discontinue the allowance of a bonus hour to certain classes of employees engaged in night work. This decision was rendered in a dispute between the Railway Employees' Department, American Federation of Labor, and the Northern Pacific, the Great Northern, the Chicago, St. Paul, Minneapolis & Omaha, the Minneapolis, St. Paul & Sault Ste. Marie, the Minneapolis & St. Louis, and the Minnesota & International. On the question of whether certain classes, to whom the bonus hour had not previously been allowed, should be granted this allowance up to July 1, 1922, the board ordered against such an allowance. A dissenting opinion was filed by board member A. O. Wharton and a supporting opinion was filed by Chairman B. W. Hooper.—*Decision No. 2071*.

Foreign Railway News

Freight Congestion in Japan

Congested freight on the Japanese railways which amounted to 1,200,000 tons on December 1, 1923, increased to over 1,400,000 tons by December 10. Most of the goods delayed were destined for the regions devastated by the recent earthquake, and as a result of the failure to deliver goods needed in Tokyo, prices for a number of commodities are rising daily, according to Commerce Reports. After investigation, the Tokyo Chamber of Commerce has offered the following suggestions to alleviate the situation:

1. The general clearing away of debris and other impediments still on highways and waterways in order to permit greater utilization of motor trucks and barges.
2. The construction of sheds and warehouses at freight concentration points in order that goods may be unloaded with celerity.
3. The taking over by the railways of the management and supervision of existing warehouses.
4. A better distribution of freight cars by railway officers.

The railway authorities assert, however, that the present congestion is inevitable and they do not believe that efficient measures for clearing up the situation can be taken at this time. Nevertheless, they admit that, unless a remedy is found, a general breakdown of transportation facilities may occur.

China Notes

PEKING.

A change of Presidents during the summer and a change of Premiers a few weeks ago has worked no change in the Ministry of Communications. The new Cabinet, gazetted two days since, contains the name of Wu Yu-lin, the present incumbent, as Minister of Communications. Although Admiral Wu has been the subject of considerable opposition due to his close personal connections with the President's brother, his courageous and efficient administration has commended itself even to the opposition. Perhaps the most characteristic act of his term was the compilation and publishing of all of the liabilities of the Ministry. This has served to destroy the illusion that the railways are indefinitely capable of bearing financial burdens and has served to crystallize sentiment toward a sound readjustment of national finance.

During the last days of the year Admiral Wu succeeded in convening a conference of the military authorities of all the provinces traversed by railways under the jurisdiction of the Ministry with the object of securing their co-operation in the prevention of interference with railway working by military men, use of passenger trains by soldiers without passes or tickets, use of first class space by soldiers and shipping of commercial goods under the guise of military supplies. The revenues under the latter head if assessed and collected at commercial rates would mean no less than \$8,000,000 annually according to statistics for 1922. Even the President himself shipped rice and other high-priced grains during the year of the famine, through the famine district to Tientsin, and secured the cancellation of freights to the extent of over \$350,000. These shipments could easily be traced to flour mills under the control of his family. But the President has mandated the findings and recommendations of the conference. These recommendations appear to be practical in that they do not aim toward an elimination of the abuse of the transportation privilege, but only at its limitation. Already news has been received of the court-martial and execution of two petty officers for infractions of the rules with the degradation of their superior.

No better comment on the youthfulness of railways in China could be given than that contained in a recent news item from London announcing the marriage of Claude W. Kinder. Kinder was the engineer under whose direction the first piece of permanent railway in China was constructed.

Some days ago Sun Mei Yao, the leader of the bandits who held up the Blue Express at Lincheng last May, was executed

for contemplated treachery. His followers, who with himself had been taken into the army as part of the ransom price of the captives made at that time, have bolted to their former rendezvous in the hills and his brother has assumed leadership. Their operations will now take the nature of a blood feud and there will be no alternative to exterminating them or allowing them to become masters of the province, even as did Chang Tso-lin in Manchuria.

During the middle of December a locomotive inspector at Fang Tze on the Shantung Railway was kidnapped at night. For nearly ten days no trace could be found of his captors and a week after a demand was received for a ransom of \$80,000; no avenue of negotiation was indicated or could be found. Almost simultaneous with the beginning of negotiations came the news that he had been shot.

Revenues of the Shantung Railway for 1923 are now estimated at \$9,000,000—an increase of 20 per cent compared with the previous year. This increase is shared by both passenger and freight traffic. Shantung has enjoyed unprecedented crops during the past season and prices for both cotton and tobacco have been high. The operating ratio is estimated to be about 60. However, this can be no better than a guess, for the material issues during the early months of the year were made without price, due to incomplete preparation for taking over the management of the line. After all interest payments, the line finds itself with surplus cash to the extent of \$2,000,000. However, this is due in considerable part to a parsimonious policy of material purchases until such time as the purchasing and stores organization is able to give complete accounts.

The cash surplus of the Shantung Railway is proving to be a not unexpected source of embarrassment. Wu Pei-fu has purchased the loyalty of the Chinese navy from Sun Yat Sen by promising regular payment of wages. A contribution of \$50,000 per month is demanded from the railway and the navy has put into Tsing Tau harbor where it rides immediately in front of the railway head office. A regiment of marines with several small field pieces has landed and taken quarters only a few yards from the head office and are drilling recruits. These marines all have fine new uniforms which have not been slept in, showing that they have recently received money from somewhere. However, they have not received it from the railway as yet, for the Chinese chief accountant refuses to draw a check. The managing director is reported to have consented to the payment as the price of holding his place. Since Wu Pei-fu is a Shantung man, like the managing director, his word is powerful. The Japanese chief accountant is reported to have taken the position that so long as the interest on the Japanese held treasury notes is paid, he will follow the orders of the managing director, intimating also that it was no concern of his if the Chinese are never able to redeem the line. The Chinese chief accountant, an American returned student, is showing surprising courage and independence and is backed morally by all the younger Chinese element.

Papers have reported the terms of a contract between unnamed Chinese promoters and a British firm for a railway to be built from Tientsin northerly to Chihfeng. The distance is approximately 500 miles. British construction engineers, chief accountant and traffic manager are to be in charge and a mortgage is to be given on all property and revenues of the line. This news needs to be considered carefully before being deemed important. The promoters give no evidence of authority from the Chinese government.

The British firm of contractors is a mere import and export firm by the name of Hollamby. The line would tap a rich agricultural district with mines nearby in the mountains which flank the line. The topography of the country would make construction inexpensive for no serious divides would be crossed. It would not be a competitor to the Peking-Mukden to any considerable extent as a mountain range gives a natural definition to the territory of each. But the project has more of the earmarks of a military venture of Wu Pei-fu who realizes that with the completion of the Chaoyang branch of the Peking-Mukden, Chang Tso-lin will have superior communications to the only alternative pass between Manchuria and Peking, if the Peking-Mukden line be rendered impossible for military transport.

The threat of foreign war vessels in the harbor of Canton has given rise to the speculation as to whether the powers would serve notice that on the basis of the Protocol of 1901 to the effect that the Peking-Mukden line can not be used for military purposes. This could be enforced from sea and would guarantee peace between Manchuria and Peking until another route could be built.

Equipment and Supplies

Locomotives

THE UNION PACIFIC is inquiring for 25 locomotives.

THE ILLINOIS CENTRAL contemplates buying 10 locomotives.

THE CANADIAN NATIONAL contemplates buying about 50 locomotives.

THE FLORIDA EAST COAST is reported to be inquiring for 25 locomotives.

THE SEABOARD AIR LINE is reported to be inquiring for 30 locomotives.

THE CHICAGO, ROCK ISLAND & PACIFIC contemplates buying 10 locomotives.

THE TATUM LUMBER COMPANY has ordered 1 Mikado type locomotive from the Baldwin Locomotive Works.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 10, 8-wheel switching type locomotives and 10 Mikado type locomotives.

Freight Cars

THE CONTINENTAL OIL COMPANY is inquiring for 3 narrow-gage tank cars.

THE DELAWARE, LACKAWANNA & WESTERN may buy 500 automobile cars.

THE SKELLY OIL COMPANY is inquiring for 30 tank cars of 8,000 gal. capacity.

THE UNION RAILROAD is inquiring for 1,000 hopper cars of 55 tons' capacity.

THE LOUISVILLE & NASHVILLE is reported to be inquiring for 4,000 freight cars.

THE CINCINNATI NORTHERN has ordered 500 box cars from the American Car & Foundry Co.

THE ATLANTIC COAST LINE is inquiring for from 50 to 75 steel underframes for caboose cars.

THE NORTHERN PACIFIC has ordered 200 steel ore cars of 75 tons' capacity from the Pressed Steel Car Company.

THE CANADIAN NATIONAL is inquiring for 1,000 box cars of 60 tons' capacity and 150 Hart convertible cars.

THE UNITED FRUIT COMPANY has ordered 30 narrow gage flat cars of 20 tons' capacity from the Gregg Company.

THE UNION REFRIGERATOR COMPANY has ordered three underframes from the American Car & Foundry Company.

JOHN MORRELL & COMPANY, Ottumwa, Ia., has ordered 100 refrigerator cars from the American Car & Foundry Company, New York.

THE SOUTHERN RAILWAY is inquiring for 1,250 all steel low side gondola cars of 50 tons' capacity and 750 steel frame hopper cars of 50 tons' capacity.

THE UNION PACIFIC, reported in the *Railway Age* of February 2 as having placed an order for 250 tank cars from the Standard Tank Car Company, has placed this order with the General American Tank Car Company.

THE NORFOLK & WESTERN has ordered 1,000 cars from the Bethlehem Steel Company and 1,000 from the Standard Steel Car Company. This is in addition to the 4,000 ordered recently, as was reported in the *RAILWAY AGE* of February 16.

THE CENTRAL OF BRAZIL, reported in the *Railway Age* of February 9 as contemplating buying 950 freight cars, is now inquiring through the car builders, for 200 gondola cars, 150 box cars, 150 gondola cars of 5 ft. 3 in. gage, 150, 20-ton gondola cars and 150 box cars.

THE NEW YORK CENTRAL, reported in the *Railway Age* of February 9 as inquiring for 1,000 or more freight cars, has ordered 2,000 from the Standard Steel Car Company, 2,000 from the American Car & Foundry Co., and 1,000 refrigerator cars from the Merchants Dispatch.

THE ATCHISON, TOPEKA & SANTA FE, reported in the *Railway Age* of January 26 as inquiring for 500, 55-ton gondola cars, 500, 40-ton flat cars, 500, 40-ton automobile cars, 500, 40-ton stock cars and 1,000, 40-ton box cars, has ordered 500 gondola cars from the American Car & Foundry Company, and 1,000 box cars and 500 automobile cars from the Pullman Company. This company expects to place orders for 500 flat cars and 500 stock cars during the present week.

Passenger Cars

THE NORTHERN PACIFIC is inquiring for 10 all-steel baggage cars.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE is inquiring for 25 milk cars.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 4 baggage cars, 3 coaches and 1 dining car.

THE GREAT WESTERN OF BRAZIL is inquiring through the car builders for 4 combination baggage and mail cars.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has bought a "Model 55" gasoline car from the J. G. Brill Company.

THE CANADIAN NATIONAL is inquiring for 20 baggage cars, 20 first class coaches, 15 combination baggage and mail cars and 10 parlor cars.

THE NEW YORK CENTRAL, reported in the *Railway Age* of January 19 as asking for bids on February 6 for new passenger equipment required by the New York Central, the Michigan Central, the Cleveland, Cincinnati, Chicago & St. Louis, and the Pittsburgh & Lake Erie, has ordered 80 baggage cars and 15 coaches from the American Car & Foundry Co.; 23 combination passenger and baggage cars from the Pressed Steel Car Company; 50 coaches and 15 dining cars from the Pullman Company and 50 coaches from the Standard Steel Car Company.

Iron and Steel

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 675,000 tie plates.

THE PENNSYLVANIA has ordered 354 tons of structural steel for a bridge over the Auglaize river, Auglaize, Ohio, from the American Bridge Company.

Track Specialties

THE WABASH has placed an order for 3,500 tons of cross-tie plates.

Machinery and Tools

THE PENNSYLVANIA has ordered a 7 ft. radial drill

THE SOUTHERN is inquiring for a number of machine tools.

THE MAINE CENTRAL is inquiring for several machine tools.

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for 44 machine tools.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 52 machine tools.

THE NEW YORK CENTRAL is inquiring for two engine lathes and a hydraulic press.

THE ATLANTIC COAST LINE has placed orders for 4 electric traveling cranes of the following capacities: 10-ton with 37 ft. span; 10-ton with 67 ft. span; 15-ton with 57 ft. span and 25-ton with 57 ft. span.

THE PULLMAN COMPANY has ordered a 7½-ton electric traveling crane for use at Michigan City, Ind., from the Shaw Electric Crane Company. The Pullman Company has placed an order also for two axle lathes and three car wheel borers.

THE SOUTHERN RAILWAY is asking for bids until February 29 for machine tools as follows: Two geared heavy duty lathes, 42-in. and 30-in., respectively; 2, 24-in. heavy duty geared head lathes; 4, 18-in. geared head heavy duty lathes; 2 tool room lathes, 16-in. and 12-in., respectively; 2 brass lathes; 2, 3-in. steel head turret lathes; 3-in. turret lathe; turret lathe for 7-in. box work; 34-in. turret lathe; 36-in. vertical turret lathe; 30-in. vertical turret boring mill; 54-in. standard boring mill; No. 1 plain milling machine; No. 2 universal milling machine; 2, 24-in. horizontal milling machines; sensitive drill press; 30-in. plain drill press; 48-in. plain radial drill press; 16-in. patent head engine lathe; 2, 36-in. heavy duty planers; 2, 32-in. heavy duty crank shapers; 3 draw cut shapers; 600-ton driving wheel press; 48-in. car wheel boring mill; double punch and shear; 48-in. single end punch; 48-in. throat single punch; 48-in. single end shear; 48-in. throat single shear; one 3,500-lb. and two 1,500-lb. single frame steam hammers; 500-lb. Bradley hammer; 3½-in. forging machine; bolt heading machine; 4 spindle nut tapper; 6 spindle staybolt machine; bull dozer; locomotive guide bar grinding machine; locomotive piston rod grinder; heavy duty power cold saw; internal link grinder; twist drill grinder; wet tool grinder; dry tool grinder; buffing wheel machine; ¾-in. to 4-in. pipe threading machine; 5 rivet heating electric furnaces; 5 rivet heating oil furnaces; 2 oil heating furnaces; driving box boring machine; flue welding machine; 24-ft. flue tumbling machine; flue roller; plate planer; plate furnace; plate bending rolls; 4 water tube boilers; 4 soot blowers; 4 stokers; 2,500 ft. steam driven air compressor; one 1,500 ft. and one 1,000 ft. electric driven air compressors; one 500 gal. and one 1,000 gal. steam driven horizontal fire pumps; 2 outside packed boiler feed pumps, capacity 7,500 gal. per hour; hydraulic power pump, capacity 2,000-lb. per sq. in.; open boiler feedwater heater; 2 motor generator sets, one direct connected steam engine generator; switchboard complete with necessary instruments and control panels for generator connections and power lines.

Miscellaneous

FOX BROTHERS & Co., New York, are inquiring for 6 freight car trucks.

Signaling

THE MONONGAHELA RAILWAY has ordered from the Union Switch & Signal Company 24 position-light signals to be used in extending its automatic block signaling from Morgantown, W. Va., northward 11 miles.

THE PENNSYLVANIA is to install at a crossing in Taylor, Wayne County, Mich., an interlocking, electro-mechanical, for a crossing, with six signals. The apparatus is to be installed by the Union Switch & Signal Company.

AT LUDWIGSTADT, GERMANY, on February 18, according to press dispatches from Berlin, a freight train of 30 cars fell off a viaduct 100 ft. high and lodged on the tops of houses, the viaduct being directly over the village. The wreck took fire and there was great destruction by the flames. Five men on the train were killed, but the number of townspeople who perished was not known. One statement says that the freight train was a runaway.

Supply Trade News

E. F. Kultchar, district maintenance engineer of the Chicago, Burlington & Quincy, has resigned to join the Ingersoll-Rand Company. Mr. Kultchar will have his headquarters at Chicago, Ill.

The Sullivan Machinery Company, Chicago, has removed its Birmingham, Ala., office from the Brown Marx building to larger quarters at 2108 Fifth avenue North. G. P. Small is local manager for Alabama.

H. E. Hughes, vice-president of the Locomotive Crane Company of America, Champaign, Ill., has been elected president, succeeding Charles Bergan, resigned. He will be succeeded by John Brenza, a director.

Manning, Maxwell & Moore, Inc., has consolidated its Cincinnati, Ohio, and Cleveland offices and has appointed E. H. Merrick, manager of the combined offices, with headquarters in the Huron-Sixth building, Cleveland, Ohio.

Walter F. Delaney has been appointed representative of the Hanna Engineering Works, Chicago, manufacturers of Hanna riveting machines, air hoists, sand sifters and I-beam trolleys, with headquarters at 203 Mutual building, Richmond, Virginia.

Theodore H. Goodnow, whose promotion to first vice-president of the Ryan Car Company, was announced in the *Railway Age* of February 9, was born on July 22, 1872, at Lathrop,



T. H. Goodnow

Mo., and entered railway service on July 23, 1890, with the Lake Shore & Michigan Southern (now a part of the New York Central). In November, 1904, he was promoted to general foreman of the car department with headquarters at Air Line Junction, Ohio, which position he held until August, 1906, when he was promoted to division master car builder of the Lake Shore & Michigan Southern, the Chicago, Indiana & Southern, and the Indiana Harbor Belt. In January, 1912, he was appointed

general superintendent of shops of Armour & Company, with headquarters at Chicago. He entered the employ of the Chicago & North Western in August, 1912, as assistant superintendent of the car department, with headquarters at Chicago, and was given charge of the car department in February, 1913. In October, 1918, he was appointed superintendent of the car department, which position he has held until his recent appointment.

The Pennsylvania Tank Car Company has been consolidated with the Pennsylvania Car Company. The general offices are at Sharon, Pa., and the Pennsylvania Car Company will operate the plants at Sharon, Pa., Kansas City, Kan., and Beaumont, Texas.

The Dempster Equipment Company, Inc., Knoxville, Tenn., has been incorporated to rebuild locomotives and freight cars and has purchased 14 acres of land at Knoxville on which the plant will be erected. George R. Dempster is president. Robert P. Thompson is vice-president and treasurer and Thomas G. Shea is secretary.

The Chipman Chemical Engineering Company, New York, on February 4 started its new arsenic reduction works at Martinez on San Francisco Bay, Cal., producing refined white arsenic from ores shipped in to the plant from various points in California and Nevada. The new plant consists of an initial installation comprising a crushing plant, McDougal 7-hearth roaster, and arsenic kitchens. The arsenic plant was designed by Ralph N. Chipman, president of the company, and Charles R. Wraith of the Anaconda Copper Mining Company, and has been erected under Mr. Chipman's personal supervision. For the present the plan is to keep the plant running on custom ore and later to roast ores to be shipped in from the company's mining properties in other sections of the country.

E. L. Lord, sales engineer of the San Francisco, Cal., branch of the Electric Storage Battery Company, Philadelphia, Pa., has been assigned to handle the railway sales for that office. He will also supervise the railway business for the Pacific district, which comprises six of the Pacific Coast states and part of Montana. Mr. Lord was born in Arcata, Cal., on March 4, 1884, and was graduated from the department of electrical engineering of the University of California in 1907. For three years he was engaged principally in power house and sub-station construction work. In May, 1910, he entered the employ of the Electric Storage Battery Company as assistant foreman and later served as foreman in its construction department. In the fall of 1912 he went to Los Angeles in connection with some special work and later became resident inspector in that city. In 1915 he returned to San Francisco as superintendent of the Exide depot, and later entered the operating department work as engineer of the San Francisco branch. In 1917, Mr. Lord began handling general sales in addition to his operating department duties. He will hereafter devote his time to the promotion of the company's railway business in the Pacific Coast territory with headquarters at San Francisco.



E. L. Lord

Robert T. Harris, formerly at the New York City office of the Blaw-Knox Company, Pittsburgh, Pa., has been transferred to Baltimore, Md., as district sales manager for all the products of the company. Walter H. Duncan, formerly field engineer for John F. Casey Company, contractors, has joined the sales staff of the road equipment department of the Blaw-Knox Company; William F. Glasser, engineer in the heavy forms department, has been promoted to assistant chief engineer of the department; Charles K. Wehn, located at the Chicago office, has been transferred to the Pittsburgh office as district manager of the standard steel building department at Pittsburgh; R. D. Spradling, located at the Baltimore office, has been appointed district manager of the standard building department at Chicago, and Dan W. Healy remains at the New York City office as district sales manager of the standard building department at New York.

The Baldwin Locomotive Works

The report of the Baldwin Locomotive Works for the year ended December 31, 1923, shows gross business second only to the record year of 1918. Gross sales last year aggregated \$102,762,075, against \$33,087,259 in 1922 and \$123,179,252 in 1918, the latter total being the highest on record. Operating income last year was \$10,184,755, the third largest on record. After allowing for all charges, including taxes, depreciation, regular preferred dividends, and other deductions, there was

reported a balance equal to \$25.58 a share on the \$20,000,000 common stock outstanding. This compares with \$19.03 a share on the common stock in 1922.

In the 1923 report \$2,800,000 is deducted from profits to be set aside for a dividend reserve for 1924. This amount is equal to dividend requirements on the preferred and common stock for the full year 1924 at the current rate of 7 per cent annually paid on each issue.

The comparative income account follows:

	1923	1922
Total sales	\$102,762,075	\$33,087,259
Cost of sales	92,577,319	31,092,897
Manufacturing profit	10,184,755	7,994,362
Other income	2,912,844	6,078,574
Gross profits	13,097,599	8,072,936
Other expenses	1,166,077	1,307,422
Removals and taxes	4,400,000	300,000
Dividends, 1924	2,800,000	
Depreciation	600,000	600,000
Deferred profit	415,057	658,995
Net cash profits	3,716,464	5,206,519
Preferred dividends	1,400,000	1,400,000
Common dividends	1,400,000	1,400,000
Surplus for year	916,464	2,406,519

The consolidated balance sheet of the Baldwin Locomotive Works and the Standard Steel Works Company, as of December 31, 1923, compares as follows:

ASSETS	1923	1922
Baldwin locomotive, real estate, etc.	\$29,309,690	\$26,898,185
Standard Steel, real estate, etc.	10,074,310	9,562,402
Investments	404,214	394,662
Inventories	7,334,244	13,503,946
Accounts receivable	16,673,611	12,052,347
Notes receivable	3,815,990	7,131,381
Securities, bonds, etc.	19,489,187	20,845,933
Cash	6,549,869	2,392,882
Deferred charges	538,977	418,927
Sinking fund	2,272,125	1,968,225
Total	\$96,462,217	\$95,168,890
LIABILITIES	1923	1922
Baldwin locomotive, preferred stock	\$20,000,000	\$20,000,000
Baldwin locomotive, common stock	20,000,000	20,000,000
Baldwin, first mortgage bonds	10,000,000	10,000,000
Standard Steel, first mortgage bonds	1,800,000	2,000,000
Accounts payable	3,515,880	7,956,320
Bills payable	4,500,000	6,106,000
Savings fund	1,975,185	1,726,585
Advances		549,000
Interest	528,582	579,511
Reserves	12,613,685	5,809,376
Surplus	21,528,885	20,442,098
Total	\$96,462,217	\$95,168,890

*Paid in January, 1924.

President Samuel M. Vaclain, in his report, says: "Business during the year has been very satisfactory. Your workshops have been properly maintained and improved and are fully prepared for such business as may offer during the year 1924."

Obituary

Henry C. Edgerton, general manager of the Edison Storage Battery Company, Orange, N. J., died on February 19, at his home in Madison, N. J., at the age of 41.

Richard Trimble, who was secretary-treasurer of the United States Steel Corporation at New York for about 21 years previous to April, 1922, died on February 18 at his home in New York at the age of 66.

B. L. Knowles, manager of the publicity department of the Worthington Pump & Machinery Corporation, New York City, died on February 14 as a result of a cerebral hemorrhage. Mr. Knowles was 45 years old at the time of his death and had spent 28 years with the Worthington Corporation.

SOME REMARKABLE COMPARATIVE figures were presented recently before the Canadian Club in Fort William, Ont., by D. C. Coleman, vice-president of the Canadian Pacific, who was outlining the development of that railway. In 1899 that road brought down to the head of the lakes 26,000,000 bushels of grain and in 1923 he stated that his road had moved 186,000,000 bushels during the crop season of navigation, which amount was as much as all the United States railways combined had handled to the three terminals of Minneapolis, Duluth and Chicago.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has awarded a contract to the Missouri Valley Bridge & Iron Works, Leavenworth, Kan., for the construction of the substructure for the extension of its bridge across the South Canadian river at Canadian, Texas, at an estimated cost of \$500,000.

CANADIAN NATIONAL.—This company has authorized the construction of improvements to the station approaches at Vancouver, B. C., at a cost of \$100,000.

CANADIAN PACIFIC.—This company has authorized the reduction of grade between Field, B. C., and Golden.

MISSISSIPPI SOUTHERN.—The Edward Hines Yellow Pine Trustees have applied to the Interstate Commerce Commission for a modification of the certificate issued for this road some time ago so as to change the route authorized to permit the construction of an extension from Kiln to Pass Christian, Miss., 14½ miles.

PENNSYLVANIA.—This company, jointly with the Erie and Baltimore & Ohio, plans the construction of a union passenger station at Akron, Ohio.

SOUTHERN.—This company has awarded a contract to the Dwight P. Robinson Company, New York, for the construction of a locomotive and car shop at Birmingham, Ala. The shop will be of the transverse type and will include the following buildings: Erecting shop, 80 ft. by 568 ft.; machine shop, 95 ft. by 468 ft.; boiler shop, 100 ft. by 240 ft.; blacksmith shop, 100 ft. by 260 ft.; forge shop, 30 ft. by 80 ft.; flue shop, 50 ft. by 80 ft.; power house, 80 ft. by 90 ft.; storehouse and office, 55 ft. by 200 ft.; paint shop, 24 ft. by 60 ft.; tank shop, 100 ft. by 158 ft.; firing-up shed, 45 ft. by 100 ft.; wash and locker building, 42 ft. by 128 ft. The erecting shop will have 24 tracks, running across its width, and will be served by an electrically operated transfer table of 250 tons' capacity, traveling its entire length. The erecting shop will also be served by one 150-ton overhead traveling crane and two 15-ton overhead traveling cranes, each running the full length of the building. The machine shop will be served by two 15-ton cranes, running its full length in a 60-ft. bay. The remaining 35 ft. of the machine shop's width will be divided into two floors, the upper being of the mezzanine order. The boiler shop will be served by a 20-ton crane with a 60-ft. span and the boiler, smith and flue shops will be served by a 20-ton crane with 60-ft. span, operating out of doors in an 800-ft. runway. The cranes will operate from the machine shop into the smith shop and from the erecting shop into the boiler shop. The flue shop will be equipped with electric flue welders and modern flue-handling machinery. The car repair shop will include the following buildings: Steel car repair shop, 108 ft. by 598 ft.; annex machine shop, 51 ft. by 156 ft.; wheel shop, 55 ft. by 125 ft.; dry lumber shed, 41 ft. by 240 ft.; wood-working mill, 100 ft. by 243 ft.; paint house, 25 ft. by 50 ft.; scrap deck, 52 ft. by 400 ft.; reclamation shop, 35 ft. by 60 ft.; wash and locker building, 36 ft. by 90 ft. The steel car shop will include three longitudinal bays. One of these will be served by two 15-ton cranes with 35-ft. span and another by two 20-ton cranes with 40-ft. span, all traveling the entire length of the building. Both the locomotive and car shops will be equipped with new machinery throughout. All will be of the latest design and electrically-driven, each machine being equipped with individual motor, so that no overhead shafting will be needed, and each machine will be run only when it is needed.

SOUTHERN PACIFIC.—This company contemplates the construction of a brick shop building and roundhouse at Jacksonville, Texas. Plans for the structures have not yet been made.

UNION PACIFIC.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension from Fort Collins, Colo., 15 miles in a general northerly direction.

UNION PACIFIC.—This company closed bids on February 11 for the construction of a three-story brick passenger station, 82 ft. by 372 ft., at Ogden, Utah.

Railway Financial News

ALASKA ANTHRACITE.—*Application for Stock Issue Denied.*—The Interstate Commerce Commission has denied without prejudice this company's application for authority to issue \$250,000 additional stock at 80 for construction purposes on the ground that a reasonable present necessity for the proposed issue has not been shown.

ATCHISON, TOPEKA & SANTA FE.—*Lease Approved.*—The Interstate Commerce Commission has authorized the Rocky Mountain & Santa Fe to acquire the line of the Santa Fe, Raton & Eastern and has authorized the Atchison, Topeka & Santa Fe to acquire control by lease of the line upon its acquisition by the Rocky Mountain company.

CANADIAN NATIONAL.—*New Director.*—Duncan J. McDougald, head of a financial firm in Toronto, has been appointed a director of the Canadian National to succeed Richard P. Gough of the same city who resigned last Fall.

CHICAGO, BURLINGTON & QUINCY.—*Bond Issue.*—The Interstate Commerce Commission has authorized the authentication and delivery of \$39,000,000 of first and refunding mortgage bonds and the sale of \$20,000,000 of the bonds at a price to net not less than 95, the proceeds to be used for additions and betterments and other corporate purposes.

CHICAGO, PEORIA & ST. LOUIS.—*Sale Postponed.*—In view of the fact that the Supreme Court has not yet rendered a decision on the attorney general's appeal from the foreclosure decree, the master will again adjourn the sale of this property from February 15 to March 15, 1924, at twelve o'clock noon.

COAL RIVER & EASTERN.—*Asks Authority to Issue Securities and Operate Lines.*—This company has applied to the Interstate Commerce Commission for authority to issue \$500,000 of first mortgage bonds and \$1,000,000 of capital stock and also to operate in interstate commerce a line from Seth to Prenter, W. Va., 11 miles, and one from Ashford to Warren S., W. Va., 2 miles. The bonds and \$250,000 of stock are to be delivered to the Coal River Collieries for the purchase of the railroad property and the balance of the bonds are to be sold to individuals by the Brotherhood Investment Company, affiliated with the Brotherhood of Locomotive Engineers, the proceeds to be used for additions and betterments.

COLORADO & SOUTHERN.—*Abandonment.*—The Interstate Commerce Commission, on further argument, held on petition of the Colorado state authorities, has reaffirmed its previous findings and issued an amended certificate authorizing the abandonment of the branch line from Buena Vista to Romley, Colo., 29.42 miles.

DETROIT & TOLEDO SHORE LINE.—*Equipment Notes Offered.*—Weilepp-Burton & Co., Baltimore, are offering at prices ranging from 100.60 and interest to 102.84 and interest, to yield from 5.38 per cent to 5.65 per cent, according to maturity, \$122,100 equipment trust 6 per cent gold notes (stamped subordinate in lien to \$245,300 notes of same issue).

INTERNATIONAL-GREAT NORTHERN.—*Sale to Gulf Coast Lines.*—A meeting of the holders of voting trust certificates of the International-Great Northern has been called for March 1 to ratify the sale of the entire common stock to the New Orleans, Texas & Mexico. See item below.

First Interest on Bonds.—The executive committee of the International-Great Northern has recommended to the board of directors the payment of 4 per cent interest on the adjustment bonds for 1923. This is the first payment of interest on the adjustment bonds, dated July 1, 1922. Under the terms of their issue, these bonds were to bear interest annually on April 1, beginning April 1, 1924, and thereafter on April 1 and October 1. From January 1, 1928, the interest is cumulative at the rate of 6 per cent.

MANISTEE & NORTHEASTERN.—*Abandonment.*—The Interstate Commerce Commission has issued a certificate authorizing the receiver to abandon, as to interstate and foreign commerce, a branch line from the Platte River to Empire Jct., Mich., 15.5 miles.

MISSOURI PACIFIC.—Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$700,000 of first refunding mortgage 6 per cent gold bonds for the purpose among others of acquiring and operating certain lines formerly owned by the Missouri Pacific and the St. Louis, Iron Mountain & Southern including the Kansas City Northwestern Railway bridge over the Kaw river.

MISSOURI RAILWAY & TERMINAL COMPANY.—Proposed Security Issue.—This company has applied to the Interstate Commerce Commission for authority to issue 8,000 shares of capital stock without par value and \$800,000 of first mortgage 6 per cent bonds, the stock and \$379,000 of the bonds to be used in connection with the acquisition of the property and \$421,000 to be used for construction purposes.

NEW ORLEANS, TEXAS & MEXICO.—Purchase of I.-G. N.—Subject to necessary corporate action of this company and the approval of the Interstate Commerce Commission and subject to approval of holders of majority of voting trust certificates, Willard B. King, James Speyer and Frederick Strauss, voting trustees, have sold the entire \$7,500,000 capital stock of the International-Great Northern to the New Orleans, Texas & Mexico. This stock has been deposited, according to the reorganization plan, under a voting trust giving voting trustees the power of sale. The price will net certificate holders thirty to thirty-one dollars a share.

The New Orleans, Texas & Mexico will offer also to adjustment bondholders of International-Great Northern the guarantee of not less than 4 per cent a year during the calendar years 1924, 1925, 1926 and 1927. This is also subject to corporate action of the Gulf Coast Lines and the approval of the Interstate Commerce Commission. In consideration of the offer, adjustment bondholders will give to New Orleans, Texas & Mexico option to purchase their bonds until January 1, 1928, at 85 and accrued interest, and thereafter at par and accrued interest. Acceptance of this offer is voluntary on the part of any bondholder.

NEW YORK, CHICAGO & ST. LOUIS.—Equipment Trust.—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of \$2,865,000 of equipment trust certificates to be sold at a price to cost not more than 6 per cent net.

ST. LOUIS SOUTHWESTERN.—Equipment Trust.—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of \$1,800,000 of equipment trust certificates to be sold at not less than 100.723.

SUPERIOR & SOUTHEASTERN.—Authorized to Operate Line.—The Interstate Commerce Commission has issued a certificate authorizing this company to operate a line of 3.42 miles near Loretta, Wis.

Dividends Declared

Canadian Pacific.—Common, 2½ per cent, quarterly; preferred, 2 per cent, semi-annually; both payable April 1 to holders of record February 29.
Chestnut Hill Railroad.—1½ per cent, quarterly, payable March 4 to holders of record February 20.
Erie & Pittsburgh.—1¼ per cent, quarterly, payable March 10 to holders of record February 29.
New Orleans, Texas & Mexico.—1¼ per cent, quarterly, payable March 1 to holders of record February 21.
Philadelphia, Germantown & Norristown.—3 per cent, quarterly, payable March 4 to holders of record February 20.
Southern Pacific.—1½ per cent, quarterly, payable April 1 to holders of record February 29.
Union Pacific.—Common, 2½ per cent, quarterly; preferred, 2 per cent, semi-annually; both payable April 1 to holders of record March 1.

Trend of Railway Stock and Bond Prices

	Feb. 19	Last Week	Last Year
Average price of 20 representative railway stocks	61.61	63.18	68.90
Average price of 20 representative railway bonds	83.37	83.99	85.14

THE CHICAGO, MILWAUKEE & ST. PAUL has issued a publication known as Everyman's Almanac, which contains weather reports and other features of the old-time almanac, with stories and pictures on the railway situation. The book will be distributed in the territory served by the railroad.

Railway Officers

Executive

J. M. Egan, manager of the refrigerator department of the Car Service Division of the A. R. A., with headquarters at Chicago, has been appointed vice-president in charge of operation of the Missouri Pacific, with headquarters at St. Louis, Mo.



J. M. Egan

Mr. Egan was born on September 1, 1880, at Amboy, Ill., and attended the De La Salle Institute, Chicago, from 1895 to 1898. He entered railway service in 1893 as a messenger on the Illinois Central and was later promoted to station agent. In 1898 Mr. Egan was appointed rodman in the maintenance of way department and in 1901 he was promoted to assistant engineer. He was promoted to supervisor in 1903 and to roadmaster in 1904. Mr.

Egan was promoted to superintendent of the Mississippi division, with headquarters at Water Valley, Miss., in June, 1911, and in September, 1915, he was transferred to the Tennessee division. He was promoted to general superintendent of the Southern lines, with headquarters at New Orleans, La., in January, 1919, and remained in this capacity until March, 1923, when he was appointed chairman of the Chicago car service committee of the American Railway Association, with headquarters at Chicago. Mr. Egan was serving in this position at the time of his appointment as vice-president in charge of operation of the Missouri Pacific.

Robert H. Newcomb, whose appointment as assistant to the vice-president of the New York, New Haven & Hartford, with headquarters at South Station, Boston, Mass., was announced in the *Railway Age* of February 9, page 399, was born at Lynn, Mass., on March 20, 1877. He was educated in the public schools of that city and at Boston University, from which latter institution he was graduated with the degree of LL.B. in 1901.



R. H. Newcomb

From 1903 to 1913, Mr. Newcomb was engaged in newspaper work in Washington, D. C., and on March 4 of the latter year entered the service of the New York, New Haven & Hartford. In the latter part of 1914 he went with the Boston & Maine, working in the traffic department

and on general work until the time of federal control. During federal control he was in the service of the federal manager of the Boston & Maine. Upon the return of the railroads to their owners on March 1, 1920, Mr. Newcomb was appointed executive assistant of the Boston & Maine, with headquarters at Boston, and remained in that position until February 1 of the present year when he entered his present position of

assistant to the vice-president of the New York, New Haven & Hartford. In addition to his work with the New Haven, Mr. Newcomb is also an instructor in economics in the Boston University College of Business Administration.

R. C. Vaughan, director of purchases and stores of the Canadian National Railways, has been appointed vice-president in charge of purchases and stores.

Financial, Legal and Accounting

Charles E. Miller, whose appointment as general attorney of the Central Railroad of New Jersey, with headquarters at 143 Liberty street, New York City, was announced in the *Railway Age* of January 19, page 266, was born on July 21, 1886, at Jersey City, N. J., and received his education at Columbia College from the years 1903 to 1905 and attended New York Law School from 1905 to 1907. Mr. Miller then entered railway service for the first time on February 1, 1908, as an attorney in the service of the legal department of the Central railroad of New Jersey. On June 1, 1916, Mr. Miller was promoted to the position of assistant general counsel, with headquarters at New York, in which capacity he was serving at the time of his recent promotion to general attorney.



C. E. Miller

Operating

J. F. Murphy, general manager of the Missouri Pacific, with headquarters at St. Louis, Mo., has been granted leave of absence, effective March 1.

H. G. Odell has been appointed superintendent of the Wichita Terminal Association, with headquarters at Wichita, Kan., succeeding **F. R. Walker**, who has been appointed joint agent.

J. R. Smith has been appointed superintendent of telegraph and telephone of the Southern, with headquarters at Charlotte, N. C., succeeding **J. A. Jones**, whose promotion to general superintendent of telegraph, with headquarters at Washington, D. C., was reported in the *Railway Age* of February 9.

C. G. Fluhr, acting superintendent of the Arizona division of the Atchison, Topeka & Santa Fe, with headquarters at Needles, Cal., has been appointed superintendent of the Arizona division. **J. A. Christie**, acting superintendent of the San Francisco Bay terminals, with headquarters at San Francisco, Cal., has been appointed superintendent of the terminals.

F. E. Hatch, trainmaster of the Centralia district of the Illinois Central, with headquarters at Carbondale, Ill., has been promoted to the newly-created position of terminal superintendent of the St. Louis terminals, with headquarters at East St. Louis, Ill. **E. D. Holdomb** has been appointed trainmaster of the Centralia district, succeeding Mr. Hatch.

W. K. Etter, acting general manager of the Atchison, Topeka & Santa Fe, Coast lines, with headquarters at Los Angeles, Cal., has been appointed general manager of the Coast lines. **I. L. Hibbard**, general manager of the Coast lines, who has been on leave of absence on account of illness, has been appointed assistant to the vice-president in charge of operation, with headquarters at Los Angeles.

G. H. Hicks, whose promotion to chief engineer of the Northwestern Pacific, with headquarters at San Francisco,

Cal., was reported in the *Railway Age* of January 19, was born on May 11, 1884, at Savanna, Ill., and entered railway service in April, 1902, in the engineering department of the Chicago, Milwaukee & St. Paul. He entered the service of the Western Pacific, which was then beginning preliminary surveys, in June, 1903, and he continued with that company until October, 1909, when he entered the valuation department of the Southern Pacific. Mr. Hicks entered the service of the Northwestern Pacific in July, 1912, and he was successively promoted to assistant engineer, assistant valuation engineer, principal assistant engineer, and acting chief engineer and valuation and property engineer. He held the last named position until his recent promotion to chief engineer.

C. M. Winter, whose promotion to assistant to the general manager of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., was reported in the

Railway Age of February 16, was born on August 20, 1867, at Stratford, Ont. He entered railway service in May, 1886, as an operator on the Wisconsin Central, being subsequently promoted to cashier, agent and yardmaster. He was promoted to general agent at Helena, Mont., in February, 1897, and he remained in that capacity until January, 1901, when he was transferred to Waukesha, Wis. Mr. Winter was later promoted to trainmaster and to assistant superintendent at Chicago and in April,

1910, he was promoted to division superintendent, with headquarters at Fond du Lac, Wis. He continued in this position after the Wisconsin Central was absorbed by the Minneapolis, St. Paul & Sault Ste. Marie. He received a commission as a major in the Russian Railway Service Corps in Manchuria and Siberia, in October, 1917, and remained in military service until March, 1920. After returning to the United States, he re-entered the service of the Minneapolis, St. Paul & Sault Ste. Marie as division superintendent at Fond du Lac and he remained in that position until March, 1923, when he was assigned to special work. Mr. Winter was engaged in this work until the time of his promotion to assistant to the general manager.

Traffic

I. T. Hanson has been appointed traffic manager of the American Short Line Railroad Association for the official classification territory, with headquarters at Washington, D. C., succeeding **R. A. Belding**, resigned to accept a position elsewhere.

H. R. Mathewson, assistant general agent in the passenger department of the Canadian Pacific, with headquarters at Chicago, has been promoted to general agent, with headquarters at Buffalo, N. Y., succeeding **D. R. Kennedy**, promoted.

J. C. Boyer, traveling freight and passenger agent for the Chicago, Burlington & Quincy, with headquarters at San Francisco, Cal., has been promoted to general agent, with headquarters at Cincinnati, Ohio, succeeding **H. K. Miles**, promoted.

M. W. Dancy, general agent for the Chicago & Alton, with headquarters at Peoria, Ill., has been promoted to assistant general freight and passenger agent, with headquarters at St. Louis, Mo., succeeding **S. A. Williams**, whose promotion to general freight agent was reported in the *Railway Age* of February 16.



C. M. Winter

J. L. Hayes, division freight agent of the Baltimore & Ohio, with headquarters at Baltimore, Md., has been promoted to assistant general freight agent, with the same headquarters, succeeding George S. Harlan, promoted. **R. J. Beggs**, division freight agent at Cumberland, Md., has been promoted to assistant general freight agent at Baltimore, succeeding H. G. Settle, promoted. **C. M. Gosnell**, division freight agent at New York, has been transferred to Baltimore, in the same capacity, succeeding Mr. Hayes.

W. W. Blakely, general freight agent of the Baltimore & Ohio, with headquarters at Pittsburgh, Pa., has been appointed assistant to the general freight traffic manager, with headquarters at Baltimore, Md. **J. H. Carroll, Jr.**, general freight agent, with headquarters at Philadelphia, Pa., has been appointed general freight agent, with headquarters at Pittsburgh, succeeding Mr. Blakely. **Samuel House**, general freight agent, with headquarters at Baltimore, has been appointed assistant freight traffic manager, with headquarters at Baltimore. **C. S. Roberts**, assistant general freight agent at Baltimore, has been appointed general freight agent, with the same headquarters, succeeding Mr. House. **G. S. Harlan**, assistant general freight agent at Baltimore, has been appointed general freight agent, with headquarters at Philadelphia, succeeding Mr. Carroll.

H. H. Gray, whose promotion to assistant general passenger agent of the Southern Pacific lines in Louisiana, with headquarters at New Orleans, La., was reported in the *Railway Age* of January 12, was born on December 30, 1892, at Grand Rapids, Mich. He entered railway service in February, 1909, as a clerk on the Pere Marquette, being promoted to assistant ticket agent in February, 1910. Mr. Gray was appointed ticket clerk for the Chicago & North Western at Chicago, in January, 1912, and in October of that year he entered the service of the Southern Pacific in the same capacity. In January, 1913, he was promoted to city ticket agent and he held this position until April, 1918, when he left railway service for a short time. Mr. Gray was appointed passenger agent for the Southern Pacific at New Orleans, La., in August, 1918, and in February, 1920, he was promoted to city passenger agent at Chicago. He was promoted to district passenger agent in October, 1922, and in August, 1923, he was promoted to general agent at Kansas City, Mo. He continued in this position until his recent promotion to the position of assistant general passenger agent.

A. R. Bogan, whose appointment as assistant general freight agent of the Missouri Pacific, with headquarters at St. Louis, Mo., was reported in the *Railway Age* of January 12, was born on November 15, 1883, at Dallas, Texas. He entered railway service in December, 1901, as an office boy on the Texas & Pacific, being subsequently promoted to mail clerk, chief mail clerk and record clerk. In October, 1903, he was promoted to assistant Texas rate clerk and in November of that year, he was promoted to Texas rate clerk. Mr. Bogan was promoted to lumber, rate and division clerk in October, 1904, and in June, 1905, he was appointed interstate rate clerk for the Gulf, Colorado & Santa Fe at Galveston, Texas. In July, 1906, he was appointed chief rate clerk for the Southern Pacific lines in Louisiana. He entered the service of the Galveston, Houston & Henderson in a similar capacity in July, 1909, and in October of that year was appointed chief clerk on the Texas & Pacific. Mr. Bogan was subsequently promoted to lumber, rate and division clerk, solicitation and routing clerk, and chief rate clerk. He was appointed chief clerk in the traffic department of the Missouri Pacific in September, 1913, and in November, 1915, was promoted to chief southwestern clerk. Mr. Bogan was appointed chief clerk to the freight traffic manager in September, 1919, and he continued in this position until his recent promotion to assistant general freight agent.

Engineering, Maintenance of Way and Signaling

L. I. Hammond, Jr., has been appointed division engineer on the Los Angeles & Salt Lake, with headquarters at Salt Lake City, Utah, succeeding **H. J. Blake**, who has been assigned to other duties.

Mechanical

T. F. Barton has been appointed general master mechanic of the western general division, except Huntington general shops, of the Chesapeake & Ohio, with headquarters at Huntington, W. Va. **G. H. Langton** has been appointed to a similar position on the eastern general division with headquarters at Clifton Forge, W. Va.

Obituary

H. F. Morris, cashier of the Chicago, Rock Island & Pacific, with headquarters at Chicago, died at Glendale, Cal., on February 16.

L. E. Katzenbach, formerly secretary and treasurer of the Great Northern, who retired in 1920, died at New Canaan, Conn., on February 15.

J. R. Veitch, assistant traffic manager of the Chicago, Milwaukee & St. Paul, whose death on February 12 was reported in the *Railway Age* of February 16, was born on November 1, 1876, at Cambridge, Ohio. He entered railway service in June, 1892, as a telegraph operator on the Baltimore & Ohio, and later held a similar position on the Chicago, Milwaukee & St. Paul. He was assigned to duties in the local freight office at Kansas City, Mo., in April, 1893, and in January, 1898, he was promoted to chief rate clerk. In July, 1898, Mr. Veitch was appointed chief clerk to the general freight and passenger agent of the Des Moines Western, and in 1900, he was appointed commercial agent for the Chicago, Milwaukee & St. Paul at Des Moines. Mr. Veitch was appointed general agent of the Iowa Central (now a part of the Minneapolis & St. Louis) at Chicago in 1901, and held this position until 1905, when he was appointed general agent for the Chicago, Milwaukee & St. Paul at Portland, Ore. He was promoted to assistant general freight agent in 1911 and served in this capacity until March, 1913, when he was promoted to assistant traffic manager. Mr. Veitch held this position until his death.

J. W. Kendrick, chairman of the board of the directors of the International-Great Northern, with headquarters at Chicago, died in that city on February 16. Mr. Kendrick was



J. W. Kendrick

born on October 14, 1853, at Worcester, Mass., and was graduated from the Worcester Polytechnic Institute in 1873. He entered railway service in 1878 as a levelman on the construction of the Yellowstone division of the Northern Pacific, and was engaged in the location of the Yellowstone and Missouri River divisions until 1880. In that year he was promoted to engineer in charge of construction of the Yellowstone and Missouri River divisions and he continued in this position until 1883, when he

was promoted to chief engineer of the St. Paul & Northern Pacific, now a part of the Northern Pacific. Mr. Kendrick was promoted to chief engineer of the Northern Pacific in 1888, and in July, 1893, he was promoted to general manager. In February, 1899, he was elected vice-president in charge of operation and he held this position until June, 1901, when he was elected vice-president in charge of operation of the Atchison, Topeka & Santa Fe. He resigned this position in June, 1911, to establish a private practice as consulting engineer at Chicago. Upon the reorganization of the International-Great Northern in December, 1922, Mr. Kendrick was elected chairman of the board of directors and he continued in that position until his death.